



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | | | | | | | |
|---|--------------------------|---|-------------------------|----|------------|--------------------------|----|--|
| (51) International Patent Classification ⁷ : C12N 15/31, C07K 14/315, 16/12, G01N 33/50, A61K 39/09, C12Q 1/68 | A2 | (11) International Publication Number: WO 00/06737 (43) International Publication Date: 10 February 2000 (10.02.00) | | | | | | |
| <p>(21) International Application Number: PCT/GB99/02451</p> <p>(22) International Filing Date: 27 July 1999 (27.07.99)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>9816337.1</td> <td>27 July 1998 (27.07.98)</td> <td>GB</td> </tr> <tr> <td>60/125,164</td> <td>19 March 1999 (19.03.99)</td> <td>US</td> </tr> </table> <p>(71) Applicant (for all designated States except US): MICROBIAL TECHNICS LIMITED [GB/GB]; 20 Trumpington Street, Cambridge CB2 1QA (GB).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): GILBERT, Christophe, François, Guy [FR/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB1 1PQ (GB). HANSBRO, Philip, Michael [GB/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB2 1QP (GB).</p> <p>(74) Agents: CHAPMAN, Paul, William et al.; Kilburn & Strode, 20 Red Lion Street, London WC1R 4PJ (GB).</p> | | 9816337.1 | 27 July 1998 (27.07.98) | GB | 60/125,164 | 19 March 1999 (19.03.99) | US | <p>(81) Designated States: CN, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published</p> <p><i>Without international search report and to be republished upon receipt of that report.</i></p> |
| 9816337.1 | 27 July 1998 (27.07.98) | GB | | | | | | |
| 60/125,164 | 19 March 1999 (19.03.99) | US | | | | | | |
| <p>(54) Title: STREPTOCOCCUS PNEUMONIAE PROTEINS AND NUCLEIC ACID MOLECULES</p> <p>(57) Abstract</p> <p>Novel protein antigens from <i>Streptococcus pneumoniae</i> are disclosed, together with nucleic acid sequences encoding them. Their use in vaccines and in screening methods is also described.</p> | | | | | | | | |

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|--|----|--|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | ML | Mali | TR | Turkey |
| BG | Bulgaria | HU | Hungary | MN | Mongolia | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MR | Mauritania | UA | Ukraine |
| BR | Brazil | IL | Israel | MW | Malawi | UG | Uganda |
| BY | Belarus | IS | Iceland | MX | Mexico | US | United States of America |
| CA | Canada | IT | Italy | NE | Niger | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NL | Netherlands | VN | Viet Nam |
| CG | Congo | KE | Kenya | NO | Norway | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NZ | New Zealand | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | PL | Poland | | |
| CM | Cameroon | KR | Republic of Korea | PT | Portugal | | |
| CN | China | KZ | Kazakhstan | RO | Romania | | |
| CU | Cuba | LC | Saint Lucia | RU | Russian Federation | | |
| CZ | Czech Republic | LI | Liechtenstein | SD | Sudan | | |
| DE | Germany | LK | Sri Lanka | SE | Sweden | | |
| DK | Denmark | LR | Liberia | SG | Singapore | | |
| EE | Estonia | | | | | | |

STREPTOCOCCUS PNEUMONIAE PROTEINS AND NUCLEIC ACID MOLECULES

The present invention relates to proteins derived from *Streptococcus pneumoniae*, nucleic acid molecules encoding such proteins, the use of the nucleic acid and/or proteins as antigens/immunogens and in detection/diagnosis, as well as methods for screening the proteins/nucleic acid sequences as potential anti-microbial targets.

Streptococcus pneumoniae, commonly referred to as the pneumococcus, is an important pathogenic organism. The continuing significance of *Streptococcus pneumoniae* infections in relation to human disease in developing and developed countries has been authoritatively reviewed (Fiber, G.R., *Science*, **265**: 1385-1387 (1994)). That indicates that on a global scale this organism is believed to be the most common bacterial cause of acute respiratory infections, and is estimated to result in 1 million childhood deaths each year, mostly in developing countries (Stansfield, S.K., *Pediatr. Infect. Dis.*, **6**: 622 (1987)). In the USA it has been suggested (Breiman *et al*, *Arch. Intern. Med.*, **150**: 1401 (1990)) that the pneumococcus is still the most common cause of bacterial pneumonia, and that disease rates are particularly high in young children, in the elderly, and in patients with predisposing conditions such as asplenia, heart, lung and kidney disease, diabetes, alcoholism, or with immunosuppressive disorders, especially AIDS. These groups are at higher risk of pneumococcal septicaemia and hence meningitis and therefore have a greater risk of dying from pneumococcal infection. The pneumococcus is also the leading cause of otitis media and sinusitis, which remain prevalent infections in children in developed countries, and which incur substantial costs.

The need for effective preventative strategies against pneumococcal infection is highlighted by the recent emergence of penicillin-resistant pneumococci. It has been reported that 6.6% of pneumococcal isolates in 13 US hospitals in 12 states were found

to be resistant to penicillin and some isolates were also resistant to other antibiotics including third generation cyclosporins (Schappert, S.M., *Vital and Health Statistics of the Centres for Disease Control/National Centre for Health Statistics*, **214**:1 (1992)). The rates of penicillin resistance can be higher (up to 20%) in some hospitals (Breiman *et al*, J. Am. Med. Assoc., **271**: 1831 (1994)). Since the development of penicillin resistance among pneumococci is both recent and sudden, coming after decades during which penicillin remained an effective treatment, these findings are regarded as alarming.

For the reasons given above, there are therefore compelling grounds for considering improvements in the means of preventing, controlling, diagnosing or treating pneumococcal diseases.

Various approaches have been taken in order to provide vaccines for the prevention of pneumococcal infections. Difficulties arise for instance in view of the variety of serotypes (at least 90) based on the structure of the polysaccharide capsule surrounding the organism. Vaccines against individual serotypes are not effective against other serotypes and this means that vaccines must include polysaccharide antigens from a whole range of serotypes in order to be effective in a majority of cases. An additional problem arises because it has been found that the capsular polysaccharides (each of which determines the serotype and is the major protective antigen) when purified and used as a vaccine do not reliably induce protective antibody responses in children under two years of age, the age group which suffers the highest incidence of invasive pneumococcal infection and meningitis.

A modification of the approach using capsule antigens relies on conjugating the polysaccharide to a protein in order to derive an enhanced immune response, particularly by giving the response T-cell dependent character. This approach has

been used in the development of a vaccine against *Haemophilus influenzae*. There are issues of cost concerning both the multi-polysaccharide vaccines and those based on conjugates.

5

A third approach is to look for other antigenic components which offer the potential to be vaccine candidates. In the present application we provide a group of proteins antigens which are secreted/exported proteins.

10

Thus, in a first aspect the present invention provides a *Streptococcus pneumoniae* protein or polypeptide having a sequence selected from those shown in table 2 herein.

15

A protein or polypeptide of the present invention may be provided in substantially pure form. For example, it may be provided in a form which is substantially free of other proteins.

20

In a preferred embodiment, a protein or polypeptide having an amino acid sequence as shown in Table 3 is provided.

25

The invention encompasses any protein coded for by a nucleic acid sequence as shown in Table 1 herein.

As discussed herein, the proteins and polypeptides of the invention are useful as antigenic material. Such material can be "antigenic" and/or "immunogenic". Generally, "antigenic" is taken to mean that the protein or polypeptide is capable of being used to raise antibodies or indeed is capable of inducing an antibody response in a subject. "Immunogenic" is taken to mean that the protein or polypeptide is capable of

eliciting a protective immune response in a subject. Thus, in the latter case, the protein or polypeptide may be capable of not only generating an antibody response and in addition non-antibody based immune responses.

5

10 The skilled person will appreciate that homologues or derivatives of the proteins or polypeptides of the invention will also find use in the context of the present invention, ie as antigenic/immunogenic material. Thus, for instance proteins or polypeptides which include one or more additions, deletions, substitutions or the like are encompassed by the present invention. In addition, it may be possible to replace one amino acid with another of similar "type". For instance replacing one hydrophobic
15 amino acid with another. One can use a program such as the CLUSTAL program to compare amino acid sequences. This program compares amino acid sequences and finds the optimal alignment by inserting spaces in either sequence as appropriate. It is possible to calculate amino acid identity or similarity (identity plus conservation of amino acid type) for an optimal alignment. A program like BLASTx will align the
20 longest stretch of similar sequences and assign a value to the fit. It is thus possible to obtain a comparison where several regions of similarity are found, each having a different score. Both types of analysis are contemplated in the present invention.

25 In the case of homologues and derivatives, the degree of identity with a protein or polypeptide as described herein is less important than that the homologue or derivative should retain its antigenicity or immunogenicity to streptococcus pneumoniae. However, suitably, homologues or derivatives having at least 60% similarity (as discussed above) with the proteins or polypeptides described herein are provided.

Preferably, homologues or derivatives having at least 70% similarity, more preferably at least 80% similarity are provided. Most preferably, homologues or derivatives having at least 90% or even 95% similarity are provided.

5 In an alternative approach, the homologues or derivatives could be fusion proteins, incorporating moieties which render purification easier, for example by effectively tagging the desired protein or polypeptide. It may be necessary to remove the "tag" or it may be the case that the fusion protein itself retains sufficient antigenicity to be useful.

10

In an additional aspect of the invention there are provided antigenic fragments of the proteins or polypeptides of the invention, or of homologues or derivatives thereof.

15

For fragments of the proteins or polypeptides described herein, or of homologues or derivatives thereof, the situation is slightly different. It is well known that is possible to screen an antigenic protein or polypeptide to identify epitopic regions, ie those regions which are responsible for the protein or polypeptide's antigenicity or immunogenicity. Methods for carrying out such screening are well known in the art. Thus, the fragments of the present invention should include one or more such epitopic regions or be sufficiently similar to such regions to retain their antigenic/immunogenic properties. Thus, for fragments according to the present invention the degree of identity is perhaps irrelevant, since they may be 100% identical to a particular part of a protein or polypeptide, homologue or derivative as described herein. The key issue, once again, is that the fragment retains the antigenic/immunogenic properties.

20

25

Thus, what is important for homologues, derivatives and fragments is that they possess at least a degree of the antigenicity/immunogenicity of the protein or polypeptide from which they are derived.

Gene cloning techniques may be used to provide a protein of the invention in substantially pure form. These techniques are disclosed, for example, in J. Sambrook *et al Molecular Cloning* 2nd Edition, Cold Spring Harbor Laboratory Press (1989).

5 Thus, in a fourth aspect, the present invention provides a nucleic acid molecule comprising or consisting of a sequence which is:

- (i) any of the DNA sequences set out in Table 1 or their RNA equivalents;
- 10 (ii) a sequence which is complementary to any of the sequences of (i);
- (iii) a sequence which codes for the same protein or polypeptide, as those sequences of (i) or (ii);
- 15 (iv) a sequence which is has substantial identity with any of those of (i), (ii) and (iii);
- (v) a sequence which codes for a homologue, derivative or fragment of a protein as defined in Table 1.

20

In a fifth aspect the present invention provides a nucleic acid molecule comprising or consisting of a sequence which is:

- (i) any of the DNA sequences set out in Table 4 or their RNA equivalents;
- 25 (ii) a sequence which is complementary to any of the sequences of (i);

(iii) a sequence which codes for the same protein or polypeptide, as those sequences of (i) or (ii);

(iv) a sequence which has substantial identity with any of those of (i), (ii) and (iii);

(v) a sequence which codes for a homologue, derivative or fragment of a protein as defined in Table 4.

10 The nucleic acid molecules of the invention may include a plurality of such sequences, and/or fragments. The skilled person will appreciate that the present invention can include novel variants of those particular novel nucleic acid molecules which are exemplified herein....Such variants are encompassed by the present invention. These may occur in nature, for example because of strain variation. For example, additions, 15 substitutions and/or deletions are included. In addition, and particularly when utilising microbial expression systems, one may wish to engineer the nucleic acid sequence by making use of known preferred codon usage in the particular organism being used for expression. Thus, synthetic or non-naturally occurring variants are also included within the scope of the invention.

20 The term "RNA equivalent" when used above indicates that a given RNA molecule has a sequence which is complementary to that of a given DNA molecule (allowing for the fact that in RNA "U" replaces "T" in the genetic code).

25 When comparing nucleic acid sequences for the purposes of determining the degree of homology or identity one can use programs such as BESTFIT and GAP (both from the Wisconsin Genetics Computer Group (GCG) software package) BESTFIT, for example, compares two sequences and produces an optimal alignment of the most

similar segments. GAP enables sequences to be aligned along their whole length and finds the optimal alignment by inserting spaces in either sequence as appropriate. Suitably, in the context of the present invention compare when discussing identity of nucleic acid sequences, the comparison is made by alignment of the sequences along
5 their whole length.

Preferably, sequences which have substantial identity have at least 50% sequence identity, desirably at least 75% sequence identity and more desirably at least 90 or at least 95% sequence identity with said sequences. In some cases the sequence identity
10 may be 99% or above.

Desirably, the term "substantial identity" indicates that said sequence has a greater degree of identity with any of the sequences described herein than with prior art nucleic acid sequences.
15

It should however be noted that where a nucleic acid sequence of the present invention codes for at least part of a novel gene product the present invention includes within its scope all possible sequence coding for the gene product or for a novel part thereof.

20 The nucleic acid molecule may be in isolated or recombinant form. It may be incorporated into a vector and the vector may be incorporated into a host. Such vectors and suitable hosts form yet further aspects of the present invention.

Therefore, for example, by using probes based upon the nucleic acid sequences
25 provided herein, genes in *Streptococcus pneumoniae* can be identified. They can then be excised using restriction enzymes and cloned into a vector. The vector can be introduced into a suitable host for expression.

Nucleic acid molecules of the present invention may be obtained from *S.pneumoniae* by the use of appropriate probes complementary to part of the sequences of the nucleic acid molecules. Restriction enzymes or sonication techniques can be used to obtain appropriately sized fragments for probing.

5

Alternatively PCR techniques may be used to amplify a desired nucleic acid sequence. Thus the sequence data provided herein can be used to design two primers for use in PCR so that a desired sequence, including whole genes or fragments thereof, can be targeted and then amplified to a high degree. One primer will normally show a high degree of specificity for a first sequence located on one strand of a DNA molecule, and the other primer will normally show a high degree of specificity for a second sequence located on the complementary strand of the DNA sequence and being spaced from the complementary sequence to the first sequence.

10

Typically primers will be at least 15-25 nucleotides long.

15

As a further alternative chemical synthesis may be used. This may be automated. Relatively short sequences may be chemically synthesised and ligated together to provide a longer sequence.

20

In yet a further aspect the present invention provides an immunogenic/antigenic composition comprising one or more proteins or polypeptides selected from those whose sequences are shown in Tables 2-4, or homologues or derivatives thereof, and/or fragments of any of these. In preferred embodiments, the immunogenic/antigenic composition is a vaccine or is for use in a diagnostic assay.

25

In the case of vaccines suitable additional excipients, diluents, adjuvants or the like may be included. Numerous examples of these are well known in the art.

It is also possible to utilise the nucleic acid sequences shown in Table 1 in the preparation of so-called DNA vaccines. Thus, the invention also provides a vaccine composition comprising one or more nucleic acid sequences as defined herein. The
5 use of such DNA vaccines is described in the art. See for instance, Donnelly *et al* ,
Ann. Rev. Immunol., **15**:617-648 (1997).

As already discussed herein the proteins or polypeptides described herein, their homologues or derivatives, and/or fragments of any of these, can be used in methods
10 of detecting/diagnosing *S.pneumoniae*. Such methods can be based on the detection of antibodies against such proteins which may be present in a subject. Therefore the present invention provides a method for the detection/diagnosis of *S.pneumoniae* which comprises the step of bringing into contact a sample to be tested with at least one protein, or homologue, derivative or fragment thereof, as described herein.
15 Suitably, the sample is a biological sample, such as a tissue sample or a sample of blood or saliva obtained from a subject to be tested.

In an alternative approach, the proteins described herein, or homologues, derivatives and/or fragments thereof, can be used to raise antibodies, which in turn can be used
20 to detect the antigens, and hence *S.pneumoniae*. Such antibodies form another aspect of the invention. Antibodies within the scope of the present invention may be monoclonal or polyclonal.

Polyclonal antibodies can be raised by stimulating their production in a suitable animal
25 host (e.g. a mouse, rat, guinea pig, rabbit, sheep, goat or monkey) when a protein as described herein, or a homologue, derivative or fragment thereof, is injected into the animal. If desired, an adjuvant may be administered together with the protein. Well-known adjuvants include Freund's adjuvant (complete and incomplete) and aluminium

hydroxide. The antibodies can then be purified by virtue of their binding to a protein as described herein.

Monoclonal antibodies can be produced from hybridomas. These can be formed by
5 fusing myeloma cells and spleen cells which produce the desired antibody in order to form an immortal cell line. Thus the well-known Kohler & Milstein technique (*Nature* **256** (1975)) or subsequent variations upon this technique can be used.

Techniques for producing monoclonal and polyclonal antibodies that bind to a
10 particular polypeptide/protein are now well developed in the art. They are discussed in standard immunology textbooks, for example in Roitt *et al*, *Immunology* second edition (1989), Churchill Livingstone, London.

In addition to whole antibodies, the present invention includes derivatives thereof which
15 are capable of binding to proteins etc as described herein. Thus the present invention includes antibody fragments and synthetic constructs. Examples of antibody fragments and synthetic constructs are given by Dougall *et al* in *Tibtech* **12** 372-379 (September 1994).

Antibody fragments include, for example, Fab, F(ab')₂ and Fv fragments. Fab
20 fragments (These are discussed in Roitt *et al* [*supra*]). Fv fragments can be modified to produce a synthetic construct known as a single chain Fv (scFv) molecule. This includes a peptide linker covalently joining V_h and V_l regions, which contributes to the stability of the molecule. Other synthetic constructs that can be used include CDR
25 peptides. These are synthetic peptides comprising antigen-binding determinants. Peptide mimetics may also be used. These molecules are usually conformationally restricted organic rings that mimic the structure of a CDR loop and that include antigen-interactive side chains.

Synthetic constructs include chimaeric molecules. Thus, for example, humanised (or primatised) antibodies or derivatives thereof are within the scope of the present invention. An example of a humanised antibody is an antibody having human
5 framework regions, but rodent hypervariable regions. Ways of producing chimaeric antibodies are discussed for example by Morrison *et al* in PNAS, **81**, 6851-6855 (1984) and by Takeda *et al* in Nature. **314**, 452-454 (1985).

Synthetic constructs also include molecules comprising an additional moiety that
10 provides the molecule with some desirable property in addition to antigen binding. For example the moiety may be a label (e.g. a fluorescent or radioactive label). Alternatively, it may be a pharmaceutically active agent.

Antibodies, or derivatives thereof, find use in detection/diagnosis of *S.pneumoniae*.
15 Thus, in another aspect the present invention provides a method for the detection/diagnosis of *S.pneumoniae* which comprises the step of bringing into contact a sample to be tested and antibodies capable of binding to one or more proteins described herein, or to homologues, derivatives and/or fragments thereof.

20 In addition, so-called "Affibodies" may be utilised. These are binding proteins selected from combinatorial libraries of an alpha-helical bacterial receptor domain (Nord *et al* ,) Thus, Small protein domains, capable of specific binding to different target proteins can be selected using combinatorial approaches.

25 It will also be clear that the nucleic acid sequences described herein may be used to detect/diagnose *S.pneumoniae*. Thus, in yet a further aspect, the present invention provides a method for the detection/diagnosis of *S.pneumoniae* which comprises the

step of bringing into contact a sample to be tested with at least one nucleic acid sequence as described herein. Suitably, the sample is a biological sample, such as a tissue sample or a sample of blood or saliva obtained from a subject to be tested. Such samples may be pre-treated before being used in the methods of the invention.

5 Thus, for example, a sample may be treated to extract DNA. Then, DNA probes based on the nucleic acid sequences described herein (ie usually fragments of such sequences) may be used to detect nucleic acid from *S.pneumoniae*.

In additional aspects, the present invention provides:

10

(a) a method of vaccinating a subject against *S.pneumoniae* which comprises the step of administering to a subject a protein or polypeptide of the invention, or a derivative, homologue or fragment thereof, or an immunogenic composition of the invention;

15

(b) a method of vaccinating a subject against *S.pneumoniae* which comprises the step of administering to a subject a nucleic acid molecule as defined herein;

20

(c) a method for the prophylaxis or treatment of *S.pneumoniae* infection which comprises the step of administering to a subject a protein or polypeptide of the invention, or a derivative, homologue or fragment thereof, or an immunogenic composition of the invention;

25

(d) a method for the prophylaxis or treatment of *S.pneumoniae* infection which comprises the step of administering to a subject a nucleic acid molecule as defined herein;

(e) a kit for use in detecting/diagnosing *S.pneumoniae* infection comprising one

or more proteins or polypeptides of the invention, or homologues, derivatives or fragments thereof, or an antigenic composition of the invention; and

- (f) a kit for use in detecting/diagnosing *S.pneumoniae* infection comprising one or more nucleic acid molecules as defined herein.

Given that we have identified a group of important proteins, such proteins are potential targets for anti-microbial therapy. It is necessary, however, to determine whether each individual protein is essential for the organism's viability. Thus, the present invention also provides a method of determining whether a protein or polypeptide as described herein represents a potential anti-microbial target which comprises inactivating said protein and determining whether *S.pneumoniae* is still viable, *in vitro* or *in vivo*.

A suitable method for inactivating the protein is to effect selected gene knockouts, ie prevent expression of the protein and determine whether this results in a lethal change. Suitable methods for carrying out such gene knockouts are described in Li *et al*, *P.N.A.S.*, **94**:13251-13256 (1997).

In a final aspect the present invention provides the use of an agent capable of antagonising, inhibiting or otherwise interfering with the function or expression of a protein or polypeptide of the invention in the manufacture of a medicament for use in the treatment or prophylaxis of *S.pneumoniae* infection.

The invention will now be described with reference to the following examples, which should not be construed as in any way limiting the invention. The examples refer to the figures in which:

Figure 1: shows the results of various DNA vaccine trials; and

Figure 2: shows the results of further DNA vaccine trials.

EXAMPLE 1

5

The Genome sequencing of *Streptococcus pneumoniae* type 4 is in progress at the

Institute for Genomic Research (TIGR, Rockville, MD, USA). Up to now, the whole sequence has not been completed or published. On 21st November 1997, the
10 TIGR centre released some DNA sequences as contigs which are not accurate reflections of the finished sequence. These contigs can be downloaded from their Webster ([www@tigr.org](http://www.tigr.org)). We downloaded these contigs and created a local database using the application GCGToBLAST (Wisconsin Package Version 9.1, Genetics Computer Group (GCG), Madison, USA). This database can be searched with the
15 FastA and TfastA procedures (using the method of Pearson and Lipman (*PNAS USA*, 85:2444-2448 (1988))).

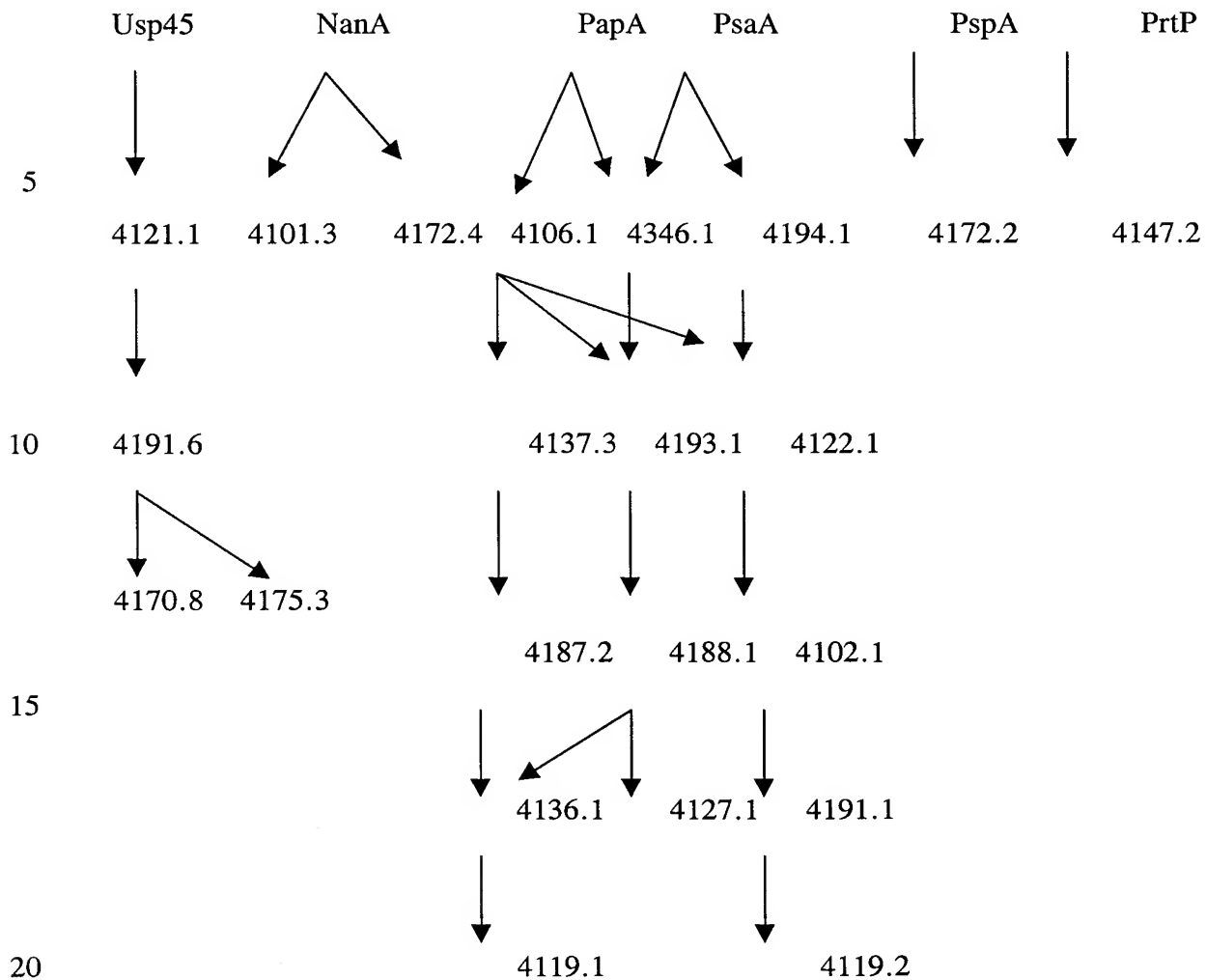
Using FastA and TfastA procedures, the local pneumococcus database was searched for putative leader sequence or anchor sequence features. Relevant sequences were
20 used to interrogate for comparative novel sequences. These were:

- (i) already described leader sequences of *Streptococcus pneumoniae* (from proteins NanA, NanB, LytA, PapA, pcpA, PsaA and PspA);
- 25 (ii) the leader sequence of Usp45, a secreted protein from *Lactococcus lactis*;
- (iii) new hypothetical leader sequences derived from the searches in (i) and (ii);

(iv) the anchor motif LPxTG, a feature common to many Gram-positive bacteria surface proteins which are anchored by a mechanism involving the Sortase complex proteins.

5

Provided below is an example of this approach, with reference to the sequences derived from the database (see table 1).



The protein leader sequences of different known exported proteins were used as a starting point for a search of the local pneumococcus database described above. The hypothetical proteins found with this search were then submitted to a Blast search in general databases such as EMBL, Swissprot etc. Proteins remaining unknown in the pneumococcus are kept and annotated. Then the search is performed again using the new potential protein leader sequence as a probe, using the TfastA procedure.

Example 2: DNA vaccine trials

pcDNA3.1+ as a DNA vaccine vector

5 **pcDNA3.1+**

The vector chosen for use as a DNA vaccine vector was pcDNA3.1 (Invitrogen) (actually pcDNA3.1+, the forward orientation was used in all cases but may be referred to as pcDNA3.1 here on). This vector has been widely and successfully employed as a host vector to test vaccine candidate genes to give protection against pathogens in the literature (Zhang, *et al.*, Kurar and Splitter, Anderson *et al.*). The vector was designed for high-level stable and non-replicative transient expression in mammalian cells. pcDNA3.1 contains the ColE1 origin of replication which allows convenient high-copy number replication and growth in *E. coli*. This in turn allows rapid and efficient cloning and testing of many genes. The pcDNA3.1 vector has a large number of cloning sites and also contains the gene encoding ampicillin resistance to aid in cloning selection and the human cytomegalovirus (CMV) immediate-early promoter/enhancer which permits efficient, high-level expression of the recombinant protein. The CMV promoter is a strong viral promoter in a wide range of cell types including both muscle and immune (antigen presenting) cells. This is important for optimal immune response as it remains unknown as to which cells types are most important in generating a protective response *in vivo*. A T7 promoter upstream of the multiple cloning site affords efficient expression of the modified insert of interest and which allows *in vitro* transcription of a cloned gene in the sense orientation.

Zhang, D., Yang, X., Berry, J. Shen, C., McClarty, G. and Brunham, R.C. (1997) "DNA vaccination with the major outer-membrane protein genes induces acquired immunity to *Chlamydia trachomatis* (mouse pneumonitis) infection". *Infection and Immunity*, **176**, 1035-40.

Kurar, E. and Splitter, G.A. (1997) "Nucleic acid vaccination of *Brucella abortus* ribosomal L7/L12 gene elicits immune response". *Vaccine*, **15**, 1851-57.

Anderson, R., Gao, X.-M., Papakonstantinou, A., Roberts, M. and Dougan, G. (1996) "Immune response in mice following immunisation with DNA encoding fragment C of tetanus toxin". *Infection and Immunity*, **64**, 3168-3173.

Preparation of DNA vaccines

40

Oligonucleotide primers were designed for each individual gene of interest derived using the LEEP system. Each gene was examined thoroughly, and where possible,

primers were designed such that they targeted that portion of the gene thought to encode only the mature portion of the gene protein. It was hoped that expressing those sequences that encode only the mature portion of a target gene protein, would facilitate its correct folding when expressed in mammalian cells. For example, in the majority of cases primers were designed such that putative N-terminal signal peptide sequences would not be included in the final amplification product to be cloned into the pcDNA3.1 expression vector. The signal peptide directs the polypeptide precursor to the cell membrane via the protein export pathway where it is normally cleaved off by signal peptidase I (or signal peptidase II if a lipoprotein). Hence the signal peptide does not make up any part of the mature protein whether it be displayed on the surface of the bacteria surface or secreted. Where a N-terminal leader peptide sequence was not immediately obvious, primers were designed to target the whole of the gene sequence for cloning and ultimately, expression in pcDNA3.1.

Having said that, however, other additional features of proteins may also affect the expression and presentation of a soluble protein. DNA sequences encoding such features in the genes encoding the proteins of interest were excluded during the design of oligonucleotides. These features included:

1. LPXTG cell wall anchoring motifs.
2. LXXC lipoprotein attachment sites.
3. Hydrophobic C-terminal domain.
4. Where no N-terminal signal peptide or LXXC was present the start codon was excluded.
5. Where no hydrophobic C-terminal domain or LPXTG motif was present the stop codon was removed.

Appropriate PCR primers were designed for each gene of interest and any and all of the regions encoding the above features was removed from the gene when designing these primers. The primers were designed with the appropriate enzyme restriction site followed by a conserved Kozak nucleotide sequence (in all cases) GCCACC was used. The Kozak sequence facilitates the recognition of initiator sequences by eukaryotic ribosomes) and an ATG start codon upstream of the insert of the gene of interest. For example the forward primer using a BamH1 site the primer would begin GCGGGATCCGCCACCATG followed by a small section of the 5' end of the gene of interest. The reverse primer was designed to be compatible with the forward primer and with a NotI restriction site at the 5' end in all cases (this site is TTGCGGCCGC).

PCR primers

The following PCR primers were designed and used to amplify the truncated genes of interest.

5

ID210

Forward Primer 5' CGGATCCGCCACCATGTCTTCTAATGAATCTGCCGATG
3'

10

Reverse Primer 5' TTGCGGCCGCCTGTTTAGATTGGATATCTGTAAAGACTT
3'

4172.5

15

Forward Primer 5'
CGCGGATCCGCCACCATGGATTTTCCTTCAAATTTGGAGG 3'
Reverse Primer 5' TTGCGGCCGCACCGTACTGGCTGCTGACT 3'

ID211

20

Forward Primer 5'
CGGATCCGCCACCATGAGTGAGATCAAAATTATTAACGC 3'
Reverse Primer 5' TTGCGGCCGCCGTTCCATGGTTGACTCCT 3'

25

4197.4

Forward Primer 5' CGCGGATCCGCCACCATGTGGGACATATTGGTGGAAC
3'

Reverse Primer 5' TTGCGGCCGCTTCACTTGAGCAAACCTGAATCC 3'

30

4122.1

Forward Primer 5'
CGCGGATCCGCCACCATGTCACAAGAAAAACAAAAAATGAA 3'

35

Reverse Primer 5' TTGCGGCCGCATCGACGTAGTCTCCGCC 3'

4126.7

Forward Primer 5'
CGCGGATCCGCCACCATGCTGGTTGGAACCTTCTACTATCAAT 3'

40

Reverse Primer 5' TTGCGGCCGCAACTTTCGTCCCTTTTGG 3'

4188.11

Forward Primer 5' CGCGGATCCGCCACCATGGGCAATTCTGGCGGAA 3'

Reverse Primer 5' TTGCGGCCGCTTGTTTCATAGCTTTTTTGATTGTT 3'

5

ID209

Forward Primer 5'

CGCGGATCCGCCACCATGCTATTGATACGAAATGCAGGG 3'

10

Reverse Primer 5' TTGCGGCCGCAACATAATCTAGTAAATAAGCGTAGCC 3'

ID215

Forward Primer 5' CGCGGATCCGCCACCATGACGGCGACGAATTTTC 3'

15

Reverse Primer 5' TTGCGGCCGCTTAATTCGTTTTTGAAGTAGTTGCT 3'

4170.4

Forward Primer 5'

20

CGCGGATCCGCCACCATGGCTGTTTTTCTTCGCTATCATG 3'

Reverse Primer 5' TTGCGGCCGCTTTCTTCAACAAACCTTGTTCTTG 3'

4193.1

25

Forward Primer 5'

CGCGGATCCGCCACCATGGGTAACCGCTCTTCTCGTAAC 3'

Reverse Primer 5' TTGCGGCCGCGCTTCCATCAAGGATTTTAGC 3'

Cloning

30

The insert along with the flanking features described above was amplified using PCR against a template of genomic DNA isolated from type 4 *S. pneumoniae* strain 11886 obtained from the National Collection of Type Cultures. The PCR product was cut with the appropriate restriction enzymes and cloned in to the multiple cloning site of pcDNA3.1 using conventional molecular biological techniques. Suitably mapped clones of the genes of interested were cultured and the plasmids isolated on a large scale (> 1.5 mg) using Plasmid Mega Kits (Qiagen). Successful cloning and maintenance of genes was confirmed by restriction mapping and sequencing ~700 base pairs through the 5' cloning junction of each large scale preparation of each construct.

40

Strain validation

A strain of type 4 was used in cloning and challenge methods which is the strain from which the *S. pneumoniae* genome was sequenced. A freeze dried ampoule of a homogeneous laboratory strain of type 4 *S. pneumoniae* strain NCTC 11886 was obtained from the National Collection of Type Strains. The ampoule was opened and the cultured re suspended with 0.5 ml of tryptic soy broth (0.5% glucose, 5% blood). The suspension was subcultured into 10 ml tryptic soy broth (0.5% glucose, 5% blood) and incubated statically overnight at 37°C. This culture was streaked on to 5% blood agar plates to check for contaminants and confirm viability and on to blood agar slopes and the rest of the culture was used to make 20% glycerol stocks. The slopes were sent to the Public Health Laboratory Service where the type 4 serotype was confirmed.

A glycerol stock of NCTC 11886 was streaked on a 5% blood agar plate and incubated overnight in a CO₂ gas jar at 37°C. Fresh streaks were made and optochin sensitivity was confirmed.

Pneumococcal challenge

A standard inoculum of type 4 *S. pneumoniae* was prepared and frozen down by passing a culture of pneumococcus 1x through mice, harvesting from the blood of infected animals, and grown up to a predetermined viable count of around 10⁹ cfu/ml in broth before freezing down. The preparation is set out below as per the flow chart.

Streak pneumococcal culture and confirm identity

↓
V

Grow over-night culture from 4-5 colonies on plate above

↓
V

Animal passage pneumococcal culture
(i.p. injection of cardiac bleed to harvest)

↓
V

Grow over-night culture from animal passaged pneumococcus

|
V

5 Grow day culture (to pre-determined optical density) from over-night of animal
 passage and freeze down at -70°C - This is standard minimum

|
V

10

Thaw one aliquot of standard inoculum to viable count

|
V

15

Use standard inoculum to determine effective dose (called Virulence Testing)

|
V

20

All subsequent challenges - use standard inoculum to effective dose

An aliquot of standard inoculum was diluted 500x in PBS and used to inoculate the mice.

25

Mice were lightly anaesthetised using halothane and then a dose of 1.4×10^5 cfu of pneumococcus was applied to the nose of each mouse. The uptake was facilitated by the normal breathing of the mouse, which was left to recover on its back.

30

S. pneumoniae vaccine trials

35

Vaccine trials in mice were carried out by the administration of DNA to 6 week old CBA/ca mice (Harlan, UK). Mice to be vaccinated were divided into groups of six and each group was immunised with recombinant pcDNA3.1+ plasmid DNA containing a specific target-gene sequence of interest. A total of 100 µg of DNA in Dulbecco's PBS (Sigma) was injected intramuscularly into the tibialis anterior muscle of both legs (50 µl in each leg). A boost was carried using the same procedure 4 weeks later. For comparison, control groups were included in all vaccine trials. These control groups were either unvaccinated animals or those administered with non-recombinant pcDNA3.1+ DNA (sham vaccinated) only, using the same time course described above. 3 weeks after the second immunisation, all mice groups were challenged intra-nasally with a lethal dose of *S. pneumoniae*

40

serotype 4 (strain NCTC 11886). The number of bacteria administered was monitored by plating serial dilutions of the inoculum on 5% blood agar plates. A problem with intranasal immunisations is that in some mice the inoculum bubbles out of the nostrils, this has been noted in results table and taken account of in calculations. A less obvious problem is that a certain amount of the inoculum for each mouse may be swallowed. It is assumed that this amount will be the same for each mouse and will average out over the course of inoculations. However, the sample sizes that have been used are small and this problem may have significant effects in some experiments. All mice remaining after the challenge were killed 3 or 4 days after infection. During the infection process, challenged mice were monitored for the development of symptoms associated with the onset of *S. pneumoniae* induced-disease. Typical symptoms in an appropriate order included piloerection, an increasingly hunched posture, discharge from eyes, increased lethargy and reluctance to move. The latter symptoms usually coincided with the development of a moribund state at which stage the mice were culled to prevent further suffering. These mice were deemed to be very close to death, and the time of culling was used to determine a survival time for statistical analysis. Where mice were found dead, the survival time was taken as the last time point when the mouse was monitored alive.

Interpretation of Results

A positive result was taken as any DNA sequence that was cloned and used in challenge experiments as described above which gave protection against that challenge. Protection was taken as those DNA sequences that gave statistically significant protection (to a 95% confidence level ($p < 0.05$)) and also those which were marginal or close to significant using Mann-Whitney or which show some protective features for example there were one or more outlying mice or because the time to the first death was prolonged. It is acceptable to allow marginal or non-significant results to be considered as potential positives when it is considered that the clarity of some of the results may be clouded by the problems associated with the administration of intranasal infections.

Results for vaccine trials 2, 7 and 8 (see figure 1)

| Mean survival times (hours) | | | | | | | | | |
|-----------------------------|--------------------|-----------|--------------------|------------|--------------------|-----------|------------|------------|------------|
| Mouse number | Unvacc control (2) | ID210 (2) | Unvacc control (7) | 4172.5 (7) | Unvacc control (8) | ID211 (8) | 4197.4 (8) | 4122.1 (8) | 4126.7 (8) |
| 1 | 49.0 | 55.0 | 59.6 | 72.6 | 45.1 | 102.3T | 60.1 | 50.6 | 60.0 |
| 2 | 51.0 | 46.5 | 47.2 | 67.9 | 50.8 | 55.5 | 54.9 | 77.2 | 60.0 |
| 3 | 49.0 | 49.0 | 59.6 | 54.4 | 60.4 | 60.6* | 68.4 | 60.3 | 54.8 |
| 4 | 55.0 | 59.0 | 70.9 | 75.3 | 55.2 | 45.3 | 60.1 | 50.6 | 52.6 |
| 5 | 49.0 | 55.0 | 68.6* | 70.9 | 45.1 | 55.5 | 54.9 | 50.6* | 54.8 |
| 6 | 49.0 | 49.0 | 76.0 | 75.3 | 45.1 | 102.3T | 52.7 | 44.9 | 60 |
| Mean | 50.3 | 52.3 | 63.6 | 69.4 | 50.2 | 70.2 | 58.5 | 55.7 | 57.0 |
| sd | 2.4 | 4.8 | 10.3 | 7.9 | 6.4 | 25.3 | 5.7 | 11.6 | 3.4 |
| p value | - | 0.3333 | - | 0.2104 | - | 0.0215 | 0.0621 | 0.4038 | 0.0833 |

* - bubbled when dosed so may not have received full inoculum.

T - terminated at end of experiment having no symptoms of infection.

Numbers in brackets - survival times disregarded assuming incomplete dosing
p value 1 refers to significance tests compared to unvaccinated controls

Statistical Analyses.

Trial 2 - The group vaccinated with ID210 also had a longer mean survival time than the unvaccinated controls but the results are not statistically significant.

Trial 7 - The group vaccinated with 4172.5 showed much greater survival times than unvaccinated controls although the differences were not statistically significant.

Trial 8 - The group vaccinated with ID211 survived significantly longer than unvaccinated controls. 4197.4, 4122.1 and 4126.7 vaccinated groups showed longer mean survival times than the unvaccinated group but the results were not statistically significant. The 4197.4 and 4126.7 groups also showed a prolonged time to the first death and the 4122.1 group showed 1 outlying result.

Results of pneumococcal challenge DNA vaccination trials 9-11
(see figure 2)

| Mouse number | Mean survival times (hours) | | | | | | | | | |
|--------------|-----------------------------|--------------|-----------|---------------------|-----------------|------------|--------------|---------------------|-----------------|-------------|
| | Unvacc control (9) | 4188.1 1 (9) | ID209 (9) | Unvacc control (10) | pcDNA3.1 + (10) | ID215 (10) | 4170. 4 (10) | Unvacc control (11) | pcDNA3.1 + (11) | 4193.1 (11) |
| 1 | (98.5)T | 69.4 | 60.2 | 68.4 | 58.6 | 79.2 | 68.1 | 60.0 | 53.2 | 54.8 |
| 2 | 53.4 | 53.7 | 60.2 | 59.0 | 58.6 | 54.2 | 58.6 | 50.0 | 50.4 | 54.8 |
| 3 | 53.4 | 51.2 | 60.2 | 59.0 | 50.8 | (103.2)*T | 50.9 | 60.0 | 55.4 | 68.7* |
| 4 | 53.4 | 75.0 | (98.0)*T | 45.1* | 58.6 | 58.8 | 72.1 | 55.0 | 60.6 | 54.8 |
| 5 | 70.8 | 51.2 | 60.2 | 68.4 | 46.5 | 68.3 | 68.1 | 60.0 | 50.4 | 68.7 |
| 6 | 53.4 | 61.2 | 52.9 | 59.0 | 48.9 | 58.8 | 54.0 | 50.0 | 60.6 | 68.7* |
| Mean | 56.9 | 60.3 | 58.8 | 59.8 | 53.6 | 63.9 | 62.0 | 55.8 | 55.1 | 61.7 |
| Sd | 7.8 | 10.0 | 3.3 | 8.5 | 5.6 | 10.0 | 8.7 | 5.0 | 4.6 | 7.6 |
| p value 1 | - | 0.3894 | 0.2519 | - | 0.0307 | <30.0 | <39.0 | - | - | 0.1837 |
| p value 2 | - | - | - | - | - | 0.0168 | 0.0316 | - | - | 0.0829 |

* - bubbled when dosed so may not have received full inoculum.

T - terminated at end of experiment having no symptoms of infection.

Numbers in brackets - survival times disregarded assuming incomplete dosing

p value 1 refers to significance tests compared to unvaccinated controls

p value 2 refers to significance tests compared to pcDNA3.1 + vaccinated controls

Statistical Analyses.

Trial 9 - Although not statistically significant the groups vaccinated with 4188.11 and ID209 did have noticeably higher mean survival times than unvaccinated controls.

Trial 10 - The unvaccinated control group survived for a significantly longer period than the pcDNA3.1+ vaccinated group. The groups vaccinated with ID215 and 4170.4 showed statistically significant longer survival times compared to the sham vaccinated group ($p=0.0168$ and 0.0316) but not compared to the unvaccinated group.

Trial 11 - The group vaccinated with 4193.1 was the most promising and survived an average of 6.5 hours longer than the pcDNA3.1+ vaccinated group and 6 hours longer than the unvaccinated group although the results were not statistically significant.

Table 1

4101.1

5 ATGGAAGAGTTAGTGACCTTAGATTGTTTGTATTGACAGAACTAAGATTGAAGCCAATGCCAACAAAGTATAGTT
TTGTGTGGAAGAAAACGACAGAGAAATTCTCCGCCAAACTTCAAGAACAGATACAGGTCTATTTTCAAGAAGAAA
TCACTCCCCTTCTGATTAAATATGCCATGTTTGATAAGAAAACAAAGAGAGGGTATAAAGAGTCAGCTAAAACT
TAGCGAATTGGCACTATAATGACAAGGAGGATAGCTACACACATCCTGATGGCTGGTATTATCGTTTTACCATAC
10 CAAATATCAGAAAAACAGACAGACTTCAACAAGAAATCAAGGTTTACTACGCCGACGAACCTGAATCAGCCCC
TCAAAAGGGACTGTATATGAACGAACGCTATCAAAACTTGAAGCTAAAGAATGTCAGGCGCTTTTATCTCCCA
AGGTAGACAGATTTTCGTCTAACGCAAGATTGATGTGGAACCTGTCTTTGGGCAGATAAAGGCTTCTTTGGGTTAC
AAGAGATGTAATCTGAGAGGGAAGCGTCAAGTGAGAAATGACATGGGATTGGTACTTATGGCCAATAACCTCTA
AAATATAGTAAATGAAATAA

4101.3

15 ATGGGGAAAGGCCATTGGAATCGGAAAAAGAGTTTATAGCATTCGTAAGTTTGCTGTGGGAGCTTGCTCAGTAATG
ATTGGGACTTTGTGCAGTTTTATTAGGAGGAAATATAGCTGGAGAATCTGTAGTTTATGCGGATGAAACACTTATTA
CTCATACTGCTGAGAAACCTAAAGAGGAAAAATGATAGTAGAAGAAAAGGCTGATAAAGCTTTGGAACTAAA
AATATAGTTGAAAGGACAGAACAAAGTGAACCTAGTTCAACTGAGGCTATTGCATCTGAGAAGAAAGAGATGAA
20 GCCGTAACCTCCAAAAGAGGAAAAAGTGTCTGCTAAACCGGAAGAAAAAGCTCCAAGGATAGAATCACAAGCTTC
AAATCAAGAAAAACCGCTCAAGGAAGATGCTAAAGCTGTAACAAATGAAGAAGTGAATCAAATGATTGAAGACA
GGAAAGTGGATTTTAAATCAAATTTGGTACTTTAACTCAATGCAAAATTCTAAGGAAGCCATTAAACCTGATGCAG
ACGTATCTACGTGGAAAAAATTAGATTTACCGTATGACTGGAGTATCTTTAACGATTTTCGATCATGAATCTCCTGC
ACAAAATGAAGGTGGACAGCTCAACGGTGGGGAAGCTTGGTATCGCAAGACTTTCAAACCTAGATGAAAAAGACCT
25 CAAGAAAAATGTTGCGCTTACTTTTGTATGGCGTCTACATGGATTCTCAAGTTTATGTCAATGGTCAGTTAGTGGG
CATTATCCAAATGGTTATAACCAGTTCTCATATGATATCACCAAATACCTTCAAAAAGATGGTCGTGAGAATGTGA
TTGCTGTCCATGCAGTCAACAAACAGCCAAGTAGCCGTTGGTATTCAAGGAAGTGGTATCTATCGTGATGTGACTTT
ACAAGTGACAGATAAGGTGCATGTTTGAGAAAAATGGGCAAACTATTTTAAACACCAAACTTGAAGAACAAACA
TGGCAAGGTTGAAACTCATGTGACCAGCAAAATCGTCAATACGGACGACAAAGACCATGAACCTGTAGCCGAATA
30 TCAAAATCGTTGAACGAGGTGGTCTATGCTGTAACAGGCTTAGTTTCGTACAGCGAGTCGTACCTTAAAGCACATGA
ATCAACAAGCCTAGATGCGATTTTGAAGTTGAAAGACCAAACTCTGGACTGTTTAAATGACAAACCTGCTTG
TACGAATTGATTACGCGTGTTTACCGTGACGGTCAATTGGTTGATGCTAAGAAGGATTGTTTGGTTACCGTTACT
ATCACTGGACTCCAAATGAAGGTTTCTCTTTGAATGGTGAACGTATTAATTCATGGAGTATCCTTGCACCACGA
CCATGGGGCGCTTGGAGCAGAAGAAAACTATAAAGCAGAATATCGCCGTCTCAAAACAAATGAAGGAGATGGGAG
35 TTAACCTCCATCCGTACAACCCACAACCTGCTAGTGAGCAAACTTGCAAAATCGCAGCAGAACTAGGTTTACTCGT
TCAGGAAGAGGCCCTTTGATACGTGGTATGGTGGCAAGAAACCTTATGACTATGGACGTTTCTTTGAAAAAGATGC
CACTCACCCAGAAGCTCGAAAAGGTGAAAAATGGTCTGATTTTGACCTACGTACCATGGTCGAAAGAGGGCAAAAA
CAACCTGCTATCTTCAATGTGGTCAATTGGTAATGAAATAGGTGAAGCTAATGGTGATGCCACTTTTAGCAACT
GTTAAACGTTTGGTTTAAAGTTTATCAAGGATGTTGATAAGACTCGCTATGTTACCATGGGAGCAGATAAATTCGTT
40 TCGGTAATGGTAGCGGAGGGCATGAGAAAAATTGCTGATGAACCTCGATGCTGTTGGATTAACTATTCTGAAGATA
ATTACAAAGCCCTTAGAGCTAAGCATCCAAATGGTTGATTTATGGATCAGAAACATCTTCAGCTACCCGTACACG
TGGAAAGTTACTATCGCCCTGAACGTGAATTGAAACATGCAATGGACCTGAGCGTAATTATGAACAGTCAGATTA
TGGAAATGATCGTGTGGGTTGGGGGAAAAACAGCAACCGCTTCATGGACTTTTGACCGTGACAACGCTGGCTATGC
TGGACAGTTTATCTGGACAGGTACGGACTATATTGGTGAACCTACACCATGGCACAACCAAAATCAAACCTCTGTT
45 AAGAGCTCTTACTTTGGTATCGTAGATACAGCCGGCATTCCAAAAACATGACTTCTATCTTACCAAAGCCAATGGG
TTTCTGTTAAGAAGAAACCGATGGTACACCTTCTTCTCACTGGAACCTGGGAAAAACAAAGAATTAGCATCCAAAG
TAGCTGACTCAGAAGGTAAGATTCCAGTTCGTGCTTATTCGAATGCTTCTAGTGAGAATTGTTCTTGAATGGAAA
ATCTCTTGGTCTTAAGACTTTCAATAAAAAACAAACAGCGATGGGCGGACTTACCAAGAAGGTGCAAAATGCTAA
TGAACCTTATCTTGAATGGAAGTTGCCTATCAACAGGTACCTTGGAAAGCAATTGCTCGTGATGAATCTGGCAAG
50 GAAATTGCTCGAGATAAGATTACGACTGCTGTAAGCCAGCGGCAGTTCTGTTTAAAGGAAGACCATGCGATT
GCAGCAGATGGAAGAGACTTGACTTACATCTACTATGAAATTGTTGACAGCCAGGGGAATGTGGTTCCAACCTGCT
AATAATCTGGTTTCGCTTCCAATTGCATGGCCAAGGTCAACTGGTTCGGTGTAGATAACGGAGAACAAGCCAGCCGT
GAACGCTATAAAGCGCAAGCAGATGGTTCTTGGATTTCGTAAGCATTTAATGGTAAAGGTGTTGCCATTGTCAAAT
CAACTGAACAAGCAGGGAATTCACCTGACTGCCACTCTGATCTCTTGAATCGAACCAAGTCACTGTCTTTAC
TGGTAAGAAAGAAGGACAAGAGAAGACTGTTTTGGGGACAGAAGTGCCAAAAGTACAGACCATTATTGGAGAGG
55 CACCTGAAATGCCTACCACTGTTCCGTTTGATACAGTGTGGTAGCCGTGCAAGCGTCCTGTAACTGGTCTTC
AGTAGATGTGAGCAAGCCTGGTATTGTAACCGTGAAAGGTATGGCTGACGGACGAGAAGTAGAAGCTCGTGTAGA
AGTGATTGCTCTTAAATCAGAGCTACCAAGTTGTGAAACGTATTGCTCCAAATCTGACTTGAATCTGTAGACAAA
TCTGTTTCTCTATGTTTTGATTGATGGAAGTTGTAAGAGTATGAAGTGGAAGTGGGAGATTGCCGAAGAAGATA
AAGCTAAGTTAGCAATTCCAGGTTCTCGTATTCAAGCGACCGGTTATTTAGAAGGTCAACCAATTCACACCTT
60 TGTGGTAGAAGAAGGCAATCCTGCGGCACCTGCAGTACCAACTGTAACGGTTGGTGGTGAGGCAGTAACAGGTCT
TACTAGTCAAAAACCAATGCAATACCGCACTCTTGCTTATGGAGCTAAGTTGCCAGAAGTACAGCAAGTGCTAA
AAATGCAGCTGTTACAGTTCTTCAAGCAAGCGCAGCAACCGCATGCGTGCGAGCATCTTTATTCAGCCTAAAGA
TGGTGGCCTCTTCAAACTATGCAATTCAATTCTTGAAGAAGCGCCAAAAATTGCTCACITGAGCTTGAAGTG
GAAAAAGCTGACAGTCTCAAGAAGACCAAACTGTCAAATTGTCGGTTCGAGCTCACTATCAAGATGGAACGCAA

GCTGTATTACCAGCTGATAAAGTAACCTTCTCTACAAGTGGTGAAGGGGAAGTCGCAATTCGTAAAGGAATGCTT
GAGTTGCATAAGCCAGGAGCAGTCACTCTGAACGCTGAATATGAGGGAGCTAAAGACCAAGTTGAACTCACTATC
CAAGCCAATACTGAGAAGAAGATTGCGCAATCCATCCGTCCTGTAAATGTAGTGACAGATTTCATCAGGAACCA
5 AGTCTTCCAGCAACAGTAACAGTTGAGTATGACAAAGGTTTCCCTAAAACTCATAAAGTCACTTGGCAAGCTATTC
CGAAAGAAAACTAGACTCCTATCAAACTTTGAAGTACTAGGTAAAGTTGAAGGAATTGACCTTGAAGCGCGTG
CAAAAGTCTCTGTAGAAAGGTATCGTTTCAGTTGAAGAAGTCAAGTGTGACAACTCCAATCGCAGAAGCACCACAAT
TACCAGAAAGTGTTCGGACATATGATTCAAAATGGTCACGTTTCATCAGCTAAGGTTGCATGGGATGCGATTTCGTCC
10 AGAGCAATACGCTAAGGAAGGTGTCTTTACAGTTAATGGTCGCTTAGAAGGTACGCAATTAACAATAAACTTCA
TGTTTCGCGTATCTGCTCAAACTGAGCAAGGTGCAAAACATTTCTGACCAATGGACCGGTTGAGAAATGCCACTTGCC
TTTGCTTCAGACTCAAAATCCAAGCGACCCAGTTTCAAATGTTAATGACAAGCTCATTTCCCTACAATAACCAACCAG
CCAATCGTTGGACAACTGGAATCGTACTAATCCAGAAGCTTCAGTCGGTGTCTGTTTGGAGATTTCAGGTATCTT
GAGCAACGCTCCGTTGATAATCTAAGTGTGCGGATTCCATGAAGACCATGGAGTTGGTGTACCGAAGTCTTATGTG
ATTGAGTATTATGTTGGTAAGACTGTCCCAACAGCTCCTAAAAACCCTAGTTTGTGGTAATGAGGACCATGTCT
15 TTAATGATTCTGCCAACTGGAACACAGTTACTAATCTAAAAGCCCTGCTCAACTCAAGGCTGGAGAAATGAACC
ACTTTAGCTTTGATAAAGTTGAAACCTATGCTGTTTCGTATTTCGATGGTTAAAGCAGATAACAAGCGTGGAAACGTC
TATCACAGAGGTACAAATCTTTGCGAAACAAGTTGCGGCAGCCAAAGCAAGGACAAACAAGATCCAAGTTGACGG
CAAAAGTATTCGAACTTCAACCTGATTTGACAGACTACTACCTTGAGTCTGTAGATGGAAAAGTTCCGGCAGTC
ACAGCAAGTGTAGCAACAATGGTCTCGCTACCGTCGTTCCAAGCGTTCGTGAAGGTGAGCCAGTTCGTGTCATCG
20 CGAAAGCTGAAAATGGCGACATCTTAGGAGAATACCGTCTGCACTTCACTAAGGATAAGAGCTTACTTTCTCATA
AACCAGTTGCTGCGGTTAAACAAGCTCGCTTGCTACAAGTAGGTCAAGCACTTGAATTGCCGACTAAGGTTCCAGT
TTACTTCACAGGTAAAGACGGCTACGAAACAAAAGACCTGACAGTTGAATGGGAAGAAGTTCCAGCGGAAAATCT
GACAAAAGCAGGTCAATTTACTGTTTCGAGGCGGTGTCTTGGTAGTAACCTTGTGTGCTGAGATCACTGTACGAGTG
ACAGACAAATTTGGTGAGACTCTTTGAGATAACCTTACTATGATGAAAACAGTAACCAAGGCTTTGCTTCAGCA
25 ACCAATGATATTGACAAAACTCTCATCGCGCTTGACTATCTCAATGACGGAGATCATTGCGCTTTCGCTCGTT
GGACAACTGGTCACCAACACCATCTTCTAATCCAGAAGTATCAGCGGGTGTGATTTCCGTGAAAATGGTAAGA
TTGTAGAACGGACTGTTACACAAGGAAAAGTTTCAGTTCTTTGCGATAGTGGTACGGATGCACCATCTAACTCGT
TTTAGAACGCTATGTGCGGTCCAGAGTTTGAAGTGCCAACTACTATTCAAACCTACCAAGCTACGCGCAAGCAT
30 CCATTCAACAATCCAGAAAATTGGGAAGCTGTTCTTATCGTGCGGATAAAGACATTGCAGCTGGTGATGAAATC
AACGTAACATTTAAAGCTATCAAAGCCAAAGCTATGAGATGGCGTATGGAGCGTAAAGCAGATAAGAGCGGTGTT
GCGATGATTGAGATGACCTTCTTGCACCAAGTGAATTGCCTCAAGAAAGCACTCAATCAAAGATTCTGTAGATG
GAAAAGAACTTGCTGATTTGCTGAAAATCGTCAAGACTATCAAAATTACCTATAAAGGTCAACCGCCAAAAGTCT
35 CAGTTGAAGAAAACAATCAAGTAGCTTCAACTGTGGTAGATAGTGGAGAAGATAGCTTTCCAGTACTTGTTCGCT
CGTTTCAGAAAGTGGAAAACAAGTCAAGGAATACCGTATCCACTTGACTAAGGAA
AAACCAGTTTCTGAGAAGACAGTTGCTGTACAAGAAGTCTTCCAAAATCGAATTTGTTGAAAAAGATTTG
GCATACAAGACAGTTGAGAAAAAGATTCAACACTGATCTAGGTGAAAACCTCGTGTAGAACAAAGGAAAAAGTT
GGAAAAGAACGTATCTTTACAGCGATTAATCCTGATGGAAGTAAGGAAGAAAAAACTCCGTGAAGTGGTAGAAGTT
CCGACAGACCGCATCGTCTTGGTTGGAACCAAAACAGTAGCTCAAGAAGCTAAAAAACCACAAGTGTGAGAAAAA
40 CAGATACAAAACCAATTGATTCAAGTGAAGCTAGTCAAACTAATAAAGCCAGTTACCAAGTACAGGTAGTGC
GCAAGCCAAGCAGCAGTAGCAGCAGGTTAACTCTTAGGTTTGAAGTGCAGGATTAGTAGTTACTAAAGGTAAA
AAAGAAGACTAG

4101.5
ATGGATGCAATCTTTGACCTAATCGGAAAGGTTTTCAATCCCATCTTAGAAATGGGTGGACCTGTCATCATGTTAA
45 TCATTTTGACAGTATTGGCTTTACTTTTTGGAGTGAAATTTCTCAAAGCGCTTGAAGGTGGTATCAAACCTTGCCAT
CGCTCTTACAGGTATCGGTGCTATCATCGGTATGTGTAACACTGCTTTCTCAGCATCACTAGCAAAAATTCGTTGAA
AACACTGGTATCCAATTGAGTATTACCGACGTTGGTTGGGCAACCACTTGCTACAATCACTTGGGGTTCTGCTTGG
CACTATACTTCTTGCTCATCATGTTGATTGTAACATAGTGATGCTAGCTATGAAGAAAAACAGATACACTTGTGAT
50 CGATATCTTTGATATCTGGCACTTGTCTATCAGAGTCTCTGATTAAATGGTATGCTGATAACAATGGTGTGAGT
CAAGGGGTTTCACTCTTTATTGCTACAGCAGCTATCGTCTTGTGCGGTGTGTTGAAAAATTATCAACTCTGACTTGT
GAAACCTACATTTGATGACCTTCTTAACGCCCAAGTTTCATCACCAATGACATCAACTCACATGAACATACATGAT
AACCCAGTTATCATGGTTTTGGATAAGATTTTTGAAAAATTCTTCCAGGCCTTGATAAATATGACTTTGATGCTG
CTAAATTGAACAAGAAAAATCGGTTTTCTGGGGATCTAAATTTCTCATCGGTTTCATCCTTGGTATCGTTATCGGTATT
55 ATGGGAACTCCACATCCAATTGCAGGTGTGTCAGATGCAGATAAATGGCGTCTTGTATCAAAGGATGGTGTCTC
TTGGTTTGAAGTCCCGGTGATCTTTGGAACCTTCTCATCTATCGGTTTCATGGTTCATCGCAGCCGTAGAACCACTA
TCACAAGGTATTACAAACGTTGCTACTAAACGCTCTTCAAGGACGTAAATTCATATCGGTCTTGAAGTGGCCATTCA
TCGCTGGTCTGTGATAAATCTGGGCTGTGCAACGCTACTTGCAACCAATCATGTTGATTGAAGCAGTGCTTCTTTC
AAAAGTTGGAATGGTATCTTGCCACTTGCAAGGTATCATCGCTATGGGTGTTACTCCAGCTCTCTTGGTTGTAAC
60 CGTGGTAAATTTGCTCGTATGATTATCTTCCGGAACCTCTTGTGCAACTCTTCTTCTTTTCAAGTACACTTATGTC
ACCAATTTGCAACCAACTTGTCTAAAGGTGAGTGCTTCCGAGAAGGTGTGAGCCAACTCAATTGATTACTCAC
TCTACTCTTGAAGGACCAATCGAAAACTTCTTGGTTGGACAATTGGTAACACTACAAGTGGTATATCAAAGCAA
TCCTTGGTGCAGTAGTCTTCTTGTATTCTATATCGGTATCTTGTGTTGACAGAAAAACAATGATCAAACGTAA
CGAAGAGTACGCAGCAAAAGCAAAATAA

4102.1

ATGAAGATTATGAAAAAATATTGGACTTTAGCGATATTATTCTTTTGTGTTCAATAATTCTGTTACTGCTCA
AGAAATACCTAAAAATCTTGATGGCAATATAACTCACACTCAGACTAGCGAAAGTTTTCTGAATCTGATGAAAA
ACAGGTTGACTATTCTAATAAAAAATCAAGAAGAAGTAGACCAAAATAAATTTTCGTATTCAAATCGATAAGACAGA
ATTATTTGTAACAACAGATAAACATTTAGAAAAAACTGTTGTAAATTGGAACCTGAACCACAAATAAATAACGA
5 TATTGTTAACTCTGAAAAGTAATAATTTACTAGGCGAAGATAATTTAGATAATAAAATTAAGGAAAAATGTTTCTCAT
CTAGATAAATAGAGGAGGAAATATAGAGCATGACAAAGATAAATCTTAGAATCGTCGATTGTAAGAAAAATGAAATGG
GATATAGATAAAAGTTACTGGTGGAGGCGAAAGTTATAAATTATATTCTAAAAGTAATTCTAAAGTTTCAATTGCTA
TTTTAGATTCAAGGAGTCGATTTACAAAATACTGGATTACTGAAAAATCTTTCAAATCACTCAAAAACTATGTCCC
10 CAATAAAGGATATTTAGGAAAAGAGGAGGGAGAGGAAGGAATAATATCAGATATTCAAGATAGATTAGGTCATG
GTACGGCTGTTGTAGCTCAAATTTGAGGGGATGACAAATTTAATGGAGTAAATCCTCACGTTAATATTAAACGTCTA
TAGAATATTTGGTAAGTCGTCAGCTAGTCCAGATTGGATTGTAAAAGCAATTTTGTATGCTGTAGATGATGGCAAT
GATATTATCAATCTTAGTACTGGACAATATTTAATGATTGATGGAGAATATGAGGACGGAACAAATGATTTTGAAA
CATTTTTGAAGTATAAAAAAGGCTATTGATTACGCGAAATCAAAAAAGGAGTAATTATAGTAGCTGCATTAGGGAATG
15 ACTCCCTAAATGTATCAAATCAGTCAGATTTATTGAACTTATTAGTTACGCAAAAAAGTAAGAAAACCAAGGATT
AGTAGTTGATGTTCCAGTTATTTCTCATCTACAATTTCCGGTCGGAGGCATAGATCGCTTAG
GTAATTTATCAGATTTTAGCAATAAAGGGGATTCTGATGCAATATATGCGCCTGCAGGCTCAACATTATCTCTTTC
AGAATTTAGCAATTAATAAATCTTTAATGCAGAAAAATATAAAGAAGATTGGATTTTTCGGCAACACTAGGAGG
ATATACGTATCTTTATGAAAACTCATTGCTGCTCTAAAGTTTCTGGTGCGATTGCAATGATTATTGATAAATAACA
20 AATTAAGGATCAGCCCTATAATTATATGTTTGTAAAAAAATCTGGAAGAAACATTACCAAGTAA

4106.1

ATGAAGAAAACATGGAAAGTGTTTTTAACGCTTGTAACAGCTCTTGATGCTGTTGTGCTTGTGGCCTGTGGTCAAG
GAACTGCTCTAAAGACAACAAAGAGGCAGAACTTAAGAAGGTTGACTTTATCCTAGACTGGACACCAAAATACCA
25 ACCACACAGGCTTTTATGTTGCCAAGGAAAAAGTTATTTTCAAGAAGCTGGAGTGGATGTTGATTTGAAATTCG
CACCAGAAGAAAGTTCTTCTGACTTGGTTATCAACGGAAAGGCACCATTTGCAGTGTATTTCCAAGACTACATGGC
TAAGAAATTGGAAAAAGGAGCAGGAATCACTGCCGTTGCAGCTATTGTTGAACACAATACATCAGGAATCATCTC
TCGTAATCTGATAATGTAAGCAGTCCAAAAGACTTGGTTGGTAAGAAATATGGGACATGGAATGACCCAACTGA
ACTTGCTATGTTGAAAACTTGGTAGAATCTCAAGGTGGAGACTTTGAGAAGGTTGAAAAAGTACCAAAATAACGA
30 CTCAAATCAATCACACCGATTGCCAATGGCGTCTTTGATACTGCTTGGATTACTACGGTTGGGATGGTATCCTT
GCTAAATCTCAAGGTGTAGATGCTAACTTCATGTACTTGAAAGACTATGTCAAGGAGTTTGTACTACTATTACCAG
TTATCATCGCAACACGACTATCTGAAAGATAAACAAGAAGCTCGCAAAGTCATCCGAAGCCATCAAAAAAG
GCTACCAATATGCCATGGAAACATCCAGAAGAAGCTGCAGATATTCTCATCAAGAATGCACCTGAACCTCAAGGAAA
AACGTGACTTTGTATCGAATCTCAAAAAATACTTGTCAAAGAATACGCAAGCGACAAGGAAAAATGGGGTCAAT
35 TTGACGCAGCTCGCTGGAATGCTTTCTACAAATGGGATAAAGAAAAATGGTATCCTTAAAGAAGACTTGACAGACA
AAGGCTTCACCAACGAATTTGTGAAATAA

4106.4

ATGATAAAAAATCCTAAATTATTAACCAAGCTTTTTTAAGAAGTTTTGCAATTCTAGGTGGTGTGGTCTAGTCA
TTCATATAGCTATTTATTTGACCTTTCCTTTTTATTTATTTCAACTGGAGGGGGAAAAAGTTTAAAGAGAGCGCAAG
40 AGTGTTTACGGAGTATTTAAAGACTAAGACATCTGATGAAATTCGAAGCTTACTCCAGTCTTATTCAAAGTCCCTTG
ACCATATCTGCTCACCTTAAAAGAGATATTGTAGATAAGCGGCTCCCTCTTGTGCATGACTTGGATATTAAGATG
GAAAGCTATCAAATTTATCGTGATGTTAGATATGCTGTTAGTACAGCAGATGGTAAACAGGTAACCGTGCAATT
TGTTACGGGGTGGATGTCTACAAAGAAGCAAGAATATTTTGCTTTTGTATCTCCCATATACATTTTGGTTACA
45 ATTGCTTTTCTTTGTTTTTTCTATTTTTATACTAAACGCTTGCTCAATCCTCTTTTTTACATTTTCAGAAAGTGACT
AGTAAAATGCAAGATTTGGATGACAATATTCGTTTTGATGAAAGTAGGAAAGATGAAGTTGGTGAAGTTGGAAAA
CAGATTAATGGTATGTATGAGCATTGTTGAAGGTTATTTATGAGTTGGAAAGTCGTAATGAGCAAAATTTGAAAA
TGCAAAATCAAAGGTTTCTTTGTCCGCGGAGCATCACATGAGTTGAAAACCCCTTTAGCCAGTCTTAGAATTAT
50 CCTAGAGAATATGCAGCATAATTTGGAGATTACAAAGATCATCCAAAATATATTGCAAGAGATATAAATAAGAT
TGACCAGATGAGCCACTTATTAGAAGAAGTACTGGAGTCTTCTAAATTCGAAGTGGACAGAGTGTCTGTGAGAC
CTTGACTGTTAAGCCAGTTTTAGTAGATATTTATCACGTTATCAAGAATTAGCTCATTCAATAGGTGTTACAATTG
AAAATCAATTGACAGATGCTACCAGGGTCGTCATGAGTCTTAGGGCATTGGATAAGGTTTTGACAAACCTGATTA
GTAATGCAATTAATATTAGATAAAAAATGGGCGTGTATCATATCCGAGCAAGATGGCTATCTCTATCAAAA
55 ATACATGTGCGCCTCTAAGTGACCAAGACTAGAACATTTATTGATATATTCTATCATTTCTCAAATCGTGACAGA
TAAGGATGAAAGTCCGGTTTGGGTCTTACATTGTGAATAATATTTAGAAAGCTATCAAATGGATTATAGTTTT
CTCCCTTATGAACACGGTATGGAATTTAAGATTAGCTGTAG

4106.6

ATGTATTTAGGAGATTTGATGGAGAAAGCCGAGTGTGGTCAATTTTCAATACTTTCCTTTCTATTACAAGAGTCTC
AGACGACCGTCAAGGCTGTAATGGAAGAAACAGGATTTTCAAAAGCAACCCTAACCAAAATATGTCAACCTGCTCA
60 ATGACAAGGCTTTGGATAGTGGCTTAGAGCTGGCTATTCACTCAGAAGATGAAAAATCTGCGTGTCTATCGGTGC
AGCTACCAAGGGGAGAGATATTCGGAGCTTGTTTTTGGAGAGTGTGTTAAATACCAGATTTTGGTTTATCTTCTC
TACCACCAACAGTTTTAGCCCATCAGCTGGCTCAAGAATTGGTGATTAGCGAGGCTACGCTTGGTCTGCTACTTGG
CTGGTTTAAATCAGATTTTGTCAAGATTTGATTATCCATCCAAAATGGCCGTTGGCGAGGTCCAGAGCATCAGAT
65 TCACTATTTCTATTCTGTTCTTTTCCGAAAGGCTGGTCAGATCAGGAATGGGAAGGTCAATGGAACCAAGAG
AGAAAAACAGGAGATTGCCAATTTAGAGGAAATCTGCGGTGCAAGTTTGTCTGCGGGGCAGAAATTGGACTTGGTT

CTCTGGGGCTCACATCAGTCAACAACGCTCTTCGGGTCAATGCTTGTGTCAGTTTCAAGTCATAGAAGAGAAAAATGCGA
GGGTATTTTGACAATATCTTTTATCTTCGTTTGGCTGAGAAAGGTTCCGTCCTTTTTTGGCTGGGCAACATATTCCACT
AGGAGTTGAGGATGGTGAGATGATGATATTCTTCTCTTTTCTCCTATCTCATCGCATTCTTCTCTTCACTATG
AGTATATTCTTGGTTTTGGAGGGCAGTTGGCAGATTTACTGACGCAATTGATTCAAGAAATGAAGAAGGAGGAAC
5 TATTGGGGGATTATACAGAGGACCATGTCACCTATGAACCTCAGTCAGCTTTGTGCTCAAGTCTATCTCTATAAGGG
CTATATTTTACAGGATCGCTACAAGTACCAGTTAGAGAATCGTCATCCATATTTACTGATGGAACATGATTTTAA
GAGACAGCAGAGGAGATTTTTATGCTCTACCTGCTTTTCAACAGGGGACAGATTTAGATAAGAAGATTCTCTGGG
AATGGCTCCAGTTAATCGAATATATGGCTGAAAACGGTGGCCAGCATAATGCGGATTGGTCTGGATTGACATCTGG
10 TTTTCTTGTCTTTCAAGGATGGCAGCCATTTTGAACGGTATTTGGAATACAATCGTTTTATTACCATTGAAGCTT
ATGACCTAGTCGGCATTATGATTTGCTGGTTACCAATAACCCGATTATAAGAAGGAACAGACACCAGTCTATTA
TTAAAAAATGACTTGGATATGGAGGATTTGGTAGCGATTCCGCAGTTATTATTCACTTA

4106.7

ATGGAATTTTCAAAGAAAACACGTGAATTGTCAATTAATAAATGCAGGAACGTACCCTGGACCTCTTGATTATC
15 GGTGGAGGAATCACAGGAGCTGGTGTAGCCTTGCAGGCGGCAGCTAGCGGTCTTGAGACTGGTTTGATTGAAATG
CAAGACTTTGCAGAAGGAACATCTAGTCGTTCAACAAAATTTGGTTCACGGAGGACTTCGTTACCTCAACAAATTTG
ACGTAGAAGTGGTCTCAGATACGGTTTCTGAACGTGCAGTGGTTCAACAAATCGTCCACACATTTCCAAAATCAG
ATCCAATGCTCTTACCAGTTTACGATGAAGATGGAGCAACCTTTAGCCTCTTCCGTCTTAAAGTAGCCATGGACTT
20 GTACGACCTCTTGGCAGGTGTTAGCAACACACCAAGCTGCGAACAAGGTTTGGAGCAAGGATCAAGTCTTGGAAACG
CCAGCCAACTTGAAGAAGGAAGGCTTGGTAGGAGGTGGAGTGTATCTTGACTTCCGTAACAACGATGGCGCTCT
CGTGATTGAAAACATCAAAACGTGCCAACCAAGACGGTGCCCTCATTTGCCAACACGTGAAGGCAGAAGGCTTCTCT
CTTTGACGAAAGTGGCAAGATTACAGGTGTTGTAGCTCGTGATCTCTTGACAGACCAAGTGTGTTGAAATCAAGGCC
CGTCTGGTTATTAATACAACAGGTCTTGGAGTGATAAAGTACGTAATTTGTCTAATAAGGGAACGCAATTTCTCAC
25 AAATGCGCCCAACTAAGGGAGTTCACTTGGTAGTAGATTCAAGCAAAAATCAAGGTTTACAGGCCAGTTTACTTCG
ACACAGGTTTGGGTGACGGTCGTATGGTCTTTGTTCTCCCAGTGAAAACAAGACTTACTTTGGTACAACCTGATAC
AGACTACACAGGTGATTTGGAGCATCCAAAAGTAACCTCAAGAAGATGTAGATTATCTACTTGGCATTGTCAACAA
CCGCTTCCAGAACTCAACATCACCATTGATGATATCGAAAGCAGCTGGGCAGGTCTTCG
TCCATTGCTTGCAGGAACTGACCTCTGACTATAATGGTGGAAAATAACGGTACCATCAGTGATGAAAGCTTTGA
30 CAACTTGATTGCGACTGTTGAATCTTATCTCTCCAAAGAAAAACACGTGAAGATGTTGAGTCTGCTGTGACGAAAG
CTTGAAAGTAGCACATCTGAGAAACATTTGGATCCATCTGCAGTTTCTCGTGGGTCTAGCTTGGACCGTGATGACA
ATGGTCTCTTGAATCTTGTGGTAAATCACAGACTACCGTAAGATGGCTGAAGGAGCTATGGAGCGCGTGG
TTGACATCCTCAAAGCAGAATTTGACCGTAGCTTTAAATTTGATCAATTCTAAACTTACCCTGTTTCAGGTGGAGA
ATTGAACCCAGCAAAATGTGGATTGAGAAATCGAAGCCTTTGCGCAACTTGGAGTATCACGTGGTTTGGATGACAA
35 GGAAGCTCACTATCTGGCAAACTTTACGGTTCAAATGCACCGAAAGTCTTTGCACTTGTCTACAGCTTGAACAA
GCGCCAGGACTCAGCTTGGCAGATACTTTGTCCTTCACTATGCAATGCGCAATGAGTTGACTCTTAGCCAGTTG
ACTTCTTCTTCTCGTACCAATCACATGCTCTTATGCGTGATAGCTTGGATAGTATCGTTGAGCCAAATTTGGAT
GAAATGGGACGATTCTATGACTGGACAGAAGAAGAAAAGCACTTACCCTGCTGATGTGCAAGCAGCTCTCGCT
40 AACAACGATTAGCAGAATTAATAAATTA

4106.8

ATGATGAATGAATTATTTGGAGAATTTCTAGGGACTTTAATCCTGATTCTTCTAGGAAATGGTGTGTTGTCAGGTG
TGGTTCTTCTAAACCAAGAGCAATAGCTCAGGTTGGATTGTGATTACTATGGGTTGGGGGATTGCAGTTGCGGT
TGCAGTCTTTGTATCTGGCAAGCTCAGTCCAGCTTATTTAAACCCAGCTGTGACCATCGGTGTGGCCTTAAAGGT
45 GGTGTGCTTGGGCTTCCGTTTTGCTTATATCTTAGCCAGTTGCGAGGGGCCATGCTGGGTGAGATTTGGTTTG
GTTGCAATTTCAAACCTCACTATGAGGCAGAAGAAAATGCAGGCAATATCCTGGCAACCTTCAGTACTGGACCAGC
CATCAAGGATACTGTATCAAACCTTAGTAGCGAAATCCTTGGAACTTTTGTGTTGGTGTGACAACTTTGCTTTGG
GTCTTACGACTTTCAGGCAGGTATCGGAACCTTTGCAAGTGGAACTTTGATTGTGCGGTATCGGTCTATCACTAGG
TGGGACAACAGGTTATGCCTTGAACCCAGCTCGTGACCTTGGACCTCGTATCATGCACAGCATCTTGCCAATTTCCA
50 AACAAGGGAGACGGAGACTGGTCTACGCTTGGATTCTGTTGTAGGCCCTGTTATCGGAGCAGCCTTGGCAGTG
CTTGTATTCTCACTTTTCTAG

4106.10

ATGAAAAGGACCTGGAGGAACCTATTCTGACAAATCTTAATACACCTTTTATGATTGGCAATATTGAGATTCCCA
ATCGTACCGTTTTAGCGCTATGGCTGGCGTGACCAACTCAGCCTTTCTGACTATCGCAAAGGAGCTCGGAGCTGG
55 ACTCGTTGTAATGGAATGGTCTCTGACAAGGGAATCCAATACAACAACGAAAAAACCTGCACATGCTTCATAT
CGATGAGGGCGAAAAACCTGTCTCTATCCAACCTTTTGGTAGCGATGAAGACAGCCTAGCACGCGCAGCAGAATT
CATCCAAGAAAAACCAAGACCGATATCGTCGATATCAACATGGGCTGCCCTGTCAACAAAATCGTGAAGAACGA
AGCTGGTGCTATGTGGCTCAAGGATCCAGACAAGATTTACTCCATCATCAACAAGGTCAGTCTGTCTCTGATATC
CCACTTACTGTCAAAATGCGTACCGGCTGGGCGGACCCATCTCTTGCAAGTAGAAAATGCTCTCGTCTGTAAGCTG
60 CAGGTGTTTCTGCCCTCGCCATGCATGGCCGTACCCGTGAACAAATGTATACTGGCCACGACAGCCTTGAGACCTT
TTACAAGGTTGCCCAAGCTCTAACCAAGATTCCATTATCGCCAACGGTGATATCCGTAAGTCTGCAAGAAGCCAA
GCAACGCATCGAAGAAGTTGGTGTGACGCGATCATGATTGGCCGAGCTGCCATGGGAAATCTTACCTCTTCAA
CCAAATCAACCAATTCTTGAACAGGAGAAATCCTACCTGATTGACCTTTGAAGACAAGATGAAGATCGCCTA
CGAACACTTGAAACGATTGATTAACCTCAAAGGAGAAAACGTGCGAGTTTCGTGAATTCGCGGTCTCGCTCTCA

CTATCTCCGTGGAACATCTGGCGCTGCCAACTCCGTGGAGCCATTTGCGAAGCCAGCACCTGGCAGAGATTGA
AACCCCTCTTGCAATTGGAGAAGGCTTAA

5

4107.1

10

ATGACAAAGAAGAAAATTGAGCGTATTTCTGTAATACACCGAGAAAAGATTTTATGGCTCAAGTGGTATTTTCATGC
GAGATAAAGAACAACCTAAGTATAGTGTCTTGAGCGTAAAAATGTTTGATGCTGCTAAAAATCAAGATATGCTAG
CTTATCAAAAATACGCAACTATCAAGCAGATAACAGATATTAGGGTACAAACAAGTGAGGCTGACATTTTAGAGG
CTGTAAAAGAGGTTTATGTGTACAATCACATGAATGTTATCGGAGCTTGTACGCGGATATTATTTATCAGTCAATC
ACCAGCTTATGATAAGTTAAATAAGTGGTTAATATCTATTCTGATTTGTATTTAGCGTTGTACCCTTGCCAAAA
TGGGGGTATATCATGAGATGGTAGGTATCTAG

15

4107.2

20

25

30

35

40

45

50

55

60

ATGAAAAATTCCAACGAGGCTGAGATGAAATTACTTTATACTGATATTCCGACTTCTTTGACAGAAAATTCTAACAA
GAGAGGCAGAAGAGCTAGTTGCAGCTGGCAAGCGGGTCTTCTACATTGCCCACTCTCTTTCTTTGAAAAGGA
ACGCGCCGTGCTGGAATACTTGTCCAGCAGGCTTCTTTTCGATTACCGTCACGCGCTTGTCTCAAATGGCTCGC
TATCTGGTCTTGAATGATTTACCAGCTAAAACCTACTCTTGATGATATCGGTCTTGGGTTGGCCTTTTACAAATGCCT
TGCCGAACCTCGATCCCAAGGACTTGCGTGTTTATGGCGCTATTAAAGCAGGATCCTCAATTGATCCAGCAGTTAAAT
GAGCTTTACCATGAGATGACCAAATCTCAGATGAGTTTGTGGACTTGGAGAATTTAACAGATGAGGATAAGAGG
GCGGATTTACTCTTGATTTTGGAGAAAGTAACAGCCTATCTTAATCAAGGTGAGTTAGCCAGGAAAAGTCAGTTGT
CCCATTGATTGAGGCTATTGAGAATGACAAGGTAAGTAGTGATTTTAAATCAAATCGCCTTGGTCAATTGACGGCTT
TACTCGTTTCTGCTGAGGAAGAGCGGGTTGTGGACTTACTTACGGCAAGGTTGAGATTGTTATCGGGGCT
TATGCTAGTAAGAAAGCCTATACCAGTCCTTTAGCGAGGGCAATCTCTACCAAGCCAGCGTAAAATTTCTCCATC
ATCTGGCTTCTAAATACCAACGCCTGCTCAGGACTGTTCTCAAACCTCATGAGAAGATGGATAGTTTGGACAAGGC
CTCTCGTTTGTGGAGTCTCTTATGACTTTTCAGAACTCGCTTGGATGTCGATGAGAAAAGACCGTGAAAAATTTA
CAAATCTGGTCTTGTGTTGACGCAAAAGGAGGAGTTGGAGCTAGTAGCCCGTAGTATTCTGTCAGAAATTACATGAG
AACTCAGACCTGAGCTACAAGCATTTTCGTATTCTCTTGGGGGATGTAGCTTCTTACCAGTTATCTCTCAAAACCA
TTTTTGACCAGTATCAGATTCCTTTTTATCTTGGTAGAAGCGAAGCCATGGCTCATCATCCCTTGACTCAGTTTGT
GAGTCTATTTTAGCTTTAAAACGTTACCGTTTTCTGTCAGGAGGATTGATTAATCTTCTTAGAACTGATTGTATAC
TGACCTCAGTCAGTCTGATATTGATGCTTTTGAGCAATATATCCGCTATCTTGGTATCAATGGCTTGCAGCCTTTC
AGCAAACTTCACCAATCCCAACCATGGAAAAATTAATCTTGAGCGTTTGAATGTCTCCGCTGAGAAATTTAGC
ACCTCTTGAAACCTCTTTTGCCAGCGCAAAAACAAAGGCTGAAAACTCCTACAAAAATGGAGTGTCTTTCTAAAA
AGAAGGAGCTGTGACCAAGCAGTTACAAGATTGACAACCACTTTGGAAGCTGTAGAACAGGAAAGACAAGCCG
AAGTTTGAAGGCTTCTGCCATGTTTGAACAATTTGCGACTGTTTGTCTGGTTTACAGGTTAGTCTGGAAGA
CTTCTAGCCTTGCTCCATTCTGGAATGAGTTTGTCCCAATACCGTACCATTCCAGCAACAGTGGACACTGTTCTG
GTGACAGGTTACGATTGATTGCACCATGACTGTGACTTTGTCTATGCTATTGGACTAACTCAGGACAATTTAC
CAAAAAATTTCTCAAAACACCAGTCTTCTGACAGATGAAGAAAGGCAAAACCTAAACCAAGCGACCGAAGAAGGC
GTTCAATTACTGATTGCCAGCAGTGAATAATCTCAAGAAAAATCGCTACACTATGCTTTCTTGGTCAATTCTGCTC
GTAAGCAGTTGTTCTTGTGGCTCCAAGCCTTTTAAAGCAAGTGAAGTAAGGAATCTGCCTATCTTCAAGAGTT
GATCCATTTTGGATTTAGGCGGAGAGAGAAGAGGATGAATACAAAGGACTGTCTAAGGAGGATATGGGGTCTTA
TCACAGTCTTTTGTCTAGTCTGTTGCTATCACCAGCAGGGTGAGATGAGCGATACTGAGCAAGATTTGACTTTT
GTCAAGGTTCTGTGCGGTGTATAGGTAAGGTAAGTATGATCAGCAAGGTCTGGAAAAATCCAGCTATCCCAACCAAGT
CCAAGCAGCAAGACCTTAGCCAAGGACACCTTGCAAGCTCT
CTATCTGCCAAACAGGAGTTTACCTGTCTACGTGCGGTTTGACAGAGTTTATCGCAATGAATACAGTTATTTTC
CTACGCTACGTTTTAGGCTTGCAAGGAGGAATTACGTTTGCATCCTGATGCCCGTAGTCACGGGAATTTCTTGCATC
GTATCTTTGAACGCGCCTTACAGTTGCCTAATGAAGATTCTTTGACCAACGCTCTAGAACAAGCTATTCAAGAAAC
CAGTCAAGAACGCGAATTTGAAGCTATTATCAAGAAAGTTTGGAAAGCCAGTTTACCAAGGAAGTTTGTCTGAT
GTTGCACGGACAACCTGGACATATTCTCCGACACAATCCAGCCATCGAAACCATCAAAGAAGAAGCAAAATTTGGT
GGAAAAAGACCAAGCCTTTATTCAATTAGACAATGGACGCAAGTGTCTTTGTACGAGGCAAGGTGGACCGGATTGAC
CGTTTGAAGCTAATGGAGCGATAGGAGTAGTAGACTACAAATCCAGTCTGACTCAGTTCCAGTTTCTCATTCT
TTAATGGGCTCAATTCTCAGTTACCAACCTATCTTGTGCCCTAAAAAGAGAAGGGGAGCAGAACTTTTTCGGCGC
CATGTACTTGAAATGGCTGAACCTGTCCAATCTCTGATGGCGGTAAAAAGTCTGGCAGGAGCAGTGGTAGAAGC
CAGCAAAATCTATGAAATACCAAGGGCTCTTCTTGAAAAAGAAAGCAGTTATTTAGGCGAATTTTATAACAAAA
CAAGGCTAATCAACTGACAGATGAGGAATTTAGCTCCTACTGGACTACAATGCCTATCTTTACAAGAAAGCTGCT
GAGAAGATTTAGCAGGCGGTTTCCCATCAATCTTATACTGAAAATGGCAGAAGCATTGCCCCATACGTCCAG
CAACATCAGGCTATTACAGGCTTTGAAGCCAATTACCATCTGGGCCAAGCCGTTTCTAGAAAAAGTTGGACCTAG
CTGATGGCAAGCGTCTGGTCCGAGAAAACTCAAGCAAGCTTGGCTTGAATAATAA
GAGAGGAGTTGAATCGATGA

4107.3

65

ATGAAGCTTATTCCTTTTAAAGTGAGGAGGAGATTCAAAAACTGCAAGAAGCAGAAGCAAAATTCGAGCAAGGAA
CAGAAGAAAACTGCCGAGCAATCGAAGCTATCTACACTTCTGCCAGAATATCCTGGTCTCAGCATCGGCTGGT
TCTGAAAAGACCTTTGTCTATGGCAGAGCGCATTCTGGACCAATTGGCGCGTGGTGTGAAATTTCTCAACTCTTTA

5 TCTCAACCTTTACCGTCAAGGCTGCAACTGAACTTAAAGAACGTTTAGAGAAAAAATCAGCAAGAAAAATCCAAG
AAACAGATGATGTCGACCTCAAACAACACTTGGGTCGCCAGTTGGCAGACCTACCCAACGCTGCCATTGGAACCA
TGGATTCTTTACACAAAAATTCCTTGGCAAAACATGGTTATCTGCTTGATATTGCACCTAATTTCCGTATTTTACAA
10 AACCAAGCGAGCAACTATTCTCGAAAAACGAAGTCTTTCATGAGGTCTTTGAAGCGCATTACCAAGGTAAACAG
AAAGAGACCTTTAGTCATTTGCTGAAAAAATTTGCTGGGCGGGCAAGGACGAACGGGGTCTGCGCCAGCAGGTC
TATAAAATCTATGACTTCTCCAATCCACCAGTAATCCTCAAAAGTGGCTGAGTGAATCTTCTCAAAGGATTTG
AGAAAGCTGATTTTACCAGTGAAAAAGAAAACTGACCGAGCAATCAAACAAGCCCTTTGGGATTTGGAAGCT
15 TTTCCGTTACCATCTGGATAACGATGCCAAGGAGTTTGCAAAGGCTGCCTATTTAGAAAAATGTTCAAGTTAATTCT
GGATGAAATTGGCTCCCTAAATCAGGAGTCCGATAGTCAGGCTTATCAGGCAGTGCTTGCGCGTGTGTCGCCATC
TCTAAGGAGAAAAACGGTCGAGCTCTGACTAATGCCAGCCGTAAGGCTGATTTGAAGCCCTGGCTGATGCCTAC
AACGAAGAGAGAAAAAGACCGATTTGCTAAACTAGGACAATTATCAGACCAGATAGCGAT
TCTCGACTATCAAGAACGTTATCATGGAGACACTGGAACTAGCTAAAACTTCCAATCTTTCATGAGCGATTTT
20 GTGAAGGCTTATCGTCAGAGAAAAACGACAGGAAAAATGCCCTCGAATTCTGATATCAGCCATTACACCATTTAG
ATTTTAGAGAATTTCCCAAGTTCGTGAGTCTTATCAGGAGCGCTTCCATGAAGTCATGGTCGATGAGTATCAGG
ATACCAACCATATTCAAGAACGGATGCTGGAATTGTTGCTAATGGCCACAATCGCTTTATGGTGGGAGATATCAA
GCAATCCATCTATCGTTTCCGTCAGGCAGACCCGAGATTTTCAATGAGAAATTCCAACGCTATGCGCAAAATCCC
CAAGAAGGCAGGCTCATTATCCTCAAGGAAAAATTTCCGTAGTAGTTCAGAAAGTGTCTGTCAGCAACCAATGATGTC
25 TTTGAACGTCTCATGGACCAAGAGGTGCGGCGAAATCAACTATGATAACAAGCACCAGCTTGTTTTGCCAATACCA
AACTGACTCCCAATCCAGACAACAAGGCAGCATTTCTCTCTACGACAAGGACGATACAGGTGAGGAAGAAGAGA
GTCAAACAGAAACGAACTAACAGGCGAAATGCGCTTAGTTATCAAGGAGATTCTGAAACTTCATCAAGAAAAAG
GTGTTGCCCTTTAAGGAAATTTGCCCTTCTGACCTCCAGCCGAGTCGTAATGACCAGATTCTCTCGCCCTGTCTGA
GTACGGAATTCTGTCAAAACTGACGGAGAGCAAAACAATTATCTCCAATCCCTAGAAGTGCAAGTCATGCTAGA
CACTCTTCGTGTCTTCACAATCCCCCTCAAGACTACGCTTGGTTGCCCTTATGAAGTCTCCAATGTTTGGTTTGG
30 ATGAGGATGAGCTAGCACGTTTGTCCCTTCAGAAAGCAGAGGATAAAAGTCCACGAAAAATCTCTATGAGAACTGG
TCAATGCACAAAAAATGGCAAGTAGTCAAAAAGGCTTGATTACACAGCTCTAGCTG
AAAAACTAAAGCAATTCATGGATATCTAGCTTCTTGGCGCTTGATGCCAAAACCCACTCTCTATGACTTGAT
TTGGAAGATTACAAACGACCGTTTATTATGACTATGTTGGGGCTTTGCCGAATGGTCTCTGCTAGGCAGGCCAAT
CTCTATGCCCTAGCACTGCGTGCTGATCAATTTGAAAAGAGCAATTTCAAAGGTTTGTGCGCTTTTATTCGTATGA
35 TTGACCAAGTCTTAGAAGCCAGCAGGATTTGGCAAGCGTGGCCGTCGCACCGCCAAAAGATGCAGTAGAGCTCA
TGACCATCCACAAGAGTAAAGGGCTGGAGTTTCTTACGTCTTTATCCTCAATATGGATCAAGATTCAACAAGCA
AGACTCTATGTCAAGAGTCATTCTCAGTCGTCAGAATGGTCTTGGTGTCAAATATATTGCCAAGATGGAGACAGGG
GCAGTAGAAGACCACTATCCTAAAACCATCAAACTCTCCATTCTAGTCTGACCTATAGGCAAGCAAGAGGAA
TTACAGCTAGCAAGCTATTCTGAGCAGATGCGTTTGTCTGTATGTTGCTATGACGCGGGCTGAGAAAAAGCTCTATC
40 TTGTCGGCAAGGTTCTCGTGAAGCTGGAATCCAAGATACCCAGCAGCCAAAATGGGAACTAAATAGCA
ATACTAGACTGCAAGCAGGAATTTCCAAGATTGGCTTTGGGCTATCAGTAAAGTGTTTACTAAGGACAAGCTCA
ACTTTAGTTATCGTTTTATTGGCGAAGATCAGTTGACCAGAGAAGCTATCGGAGAGTTGGAACCAAGAGTCCCTCT
CCAAGATAGCTCCCAAGCAGACAATCGTCAGTCAGATACCATCAAAGAAGCTCTGGAAATGCTGAAGGAGGTGGA
45 AGTTTATAATACTCTTACCAGCAGCTATTGAACTTCTCTAGTGTTCAAACCCCAAGTCAAAATCAAGAAATTTCTAC
GAACCAGTTATGGATATGGAAGGTGTCGAGATTGCTGGTCAAGGTGAGTCAGTAGGCAAGAAAAATCAGCTTCGAT
TTGCCAGATTTTCAACCAAGAAAAAGGTAACCTGGAGCTGAGATTGGTAGTGCTACTACGAACTCATGCAGAGA
ATTGACCTCAGCCAGCAACTAACCTTGTAGCTTAACAGAAACACTCAAAAGTTCAAACTAGCAAGTGTCTGTC
AGAGACAAGATCAATCTTGATAAAATCTTGTCTTCTTGGACAGTACTCGGTGAGGAAATTTCTGCTAATACCG
50 ACCATCTTATCGCGAGCAACCTTTCTCCATGCTCAACGAGACCAAAAGAGTCAGGAAGACTTTGTTGTCCGTGG
TATCCTTGATGGCTATCTGCTTTACGAAAAACAAATTTGTTCTGTTGACTACAAGACAGACCGCTATGATGAACCA
45 AGTCAACTCGTAGACCGCTATCGTGGTCAGTTAGCTCTATACGAAGAGGCTTTATCAGCGCCTATTGATTGAA
ATATTGAAAAATACTTGATTTTACTCGGTAAGACGAGGTTCAAGTTGTAAAAGTATAA

4109.1

50 ATGGAACCTTGCTCGCCATGCTGAAAGCTTGGGAGTAGATGCTATTGCAACGATTCCACCAATTTATTTCCGCTTGC
CAGAATACTCAGTTGCCAAATACTGGAACGATATCAGTTCTGCAGCTCAAACACAGACTACGTGATTTACAACA
TTCTCTCAATTGGCAGGGGTTGCTTTGACTCCAAGCCTTTACACAGAAATGTTGAAAAATCCTCGTGTATCGGTGT
GAAGAACTCTTCTATGCCAGTTCAAGATATCCAAACCTTTGTGACGCTTGGTGGAGAAGACCATATCGTCTTTAAT
GGTCTGATGAGCAGTTCTAGGAGGACGCTCATGGGGGCTAGGGCTGGTATCGGTGGTACTTATGGTGTATGCT
55 CAGAACTCTTCTGAAACTCAATCAGTTGATTGCGGATAAGGACCTAGAAACAGCGCGTGAATTGCAGTATGCTAT
CAACGCAATCATTGGTAAACTCACTTCTGCTCATGGAATATGTACGGTGTCTCAAGAAGTCTTGAAAAATCAAT
GAAGGCTGAATATTGGATCTGTTCCATTGACACCATGACACCATGACTGAAGAAGATCGTCCAGTTGTAGAAGCG
GCTGCTGCCTTGATTCTGTAACCAAGGAGCGCTTCTCTAA

4110.2

60 ATGTATAAGACAAAGTGTTTACGAGAGAAGTTAGTATTATTTTAAAAATTTTCTTCCCAATCCTGATCTACCAAT
TTGCCAATTATTCTGCCTCTTTTGTGATACTGCAATGACAGGTCAATACAACACTATGGACTTGGCTGGTGTATCT
ATGGCAACCAAGTATCTGGAATCCTTTCTTTACATTTCTAACAGGGATTGTGTCAGCCTTGGTGCCATATCTTGGTCA
CCATCTTGGTTCGAGGCAAAAAGGAAGAGTTGCGTCTGATTTTTTACCAATTTATTTATTTGGCCTTTGGCCATATCT
65 GTGGTCTTGTGTTGGGATGGTACTTTTCTTGGCACCAATAATCTTGAATCATATTGGGTTAGAAGCAGCAGTAGCGG
CAGTAGCGGTTGCTATCTTTGGTTTTATCTATCGGGATTATCCCCTTGTGCTCTTAGCGTCATTCTGCTTCTTGC

5 TGGATTTCGCTGGGCTTGACCAAACTGTCCATGTACCTCATGCTTTTGTACTCCCTCTCAATAGCGGATTAACTAT
CTCTTGATTACGGTGCCTTTGGTGTTCCAGAACTGGGAGGGGCTGGTGCTGGTTTAGGAACATCCTTGGCCTACT
GGGTCTTGCTTGGGATTTCTGTTCTGGTTTTATTTAAACAGGAGAAGCTCAAAGCCTTACACCTTGAGAAACGAAT
TCCACTTAATATGGATAAAATTAAGGAAGGAGTTCGTTTAGGTCTGCCTATTGGGGGAAGTGTCTTCGCGGAAGTG
10 GCTATCTTTTCAGTGGTTGGCTTGATTATGGCTAAGTTTTCGCCCTTGATTATAGCTAGTCACCAGTCAGCTATGAA
CTTTTCAAGTCTTATGTACGCCCTTCTCTATGAGTATCTCATCGGCTATGGCTATTGTCGTTTCTCTATGAAGTGGGAG
CCAAGCGATTTGATGATGCGAAAACCTATATTGGTCTAGGAAGATGGACTGCCCTCATTTTTGCGGCCTTCACCTT
AACCTTCTTTACATTTTTAGGGGAAAATGTGGCCAGTCTTTATGGTAACGACCCAAAATTTATCGATTTGACAGTG
CGTTTTTAACTTATAGTCTTTCTTCCAGTTAGCAGATACCTTTGCGGCGCCGCTTCAGGGAATTTGCGGGGGTA
TAAGGATACAGTTATTCCTTTTACCTTGGTTTGCTTGGTTATTGGGGCGTAGCAATCCCTGTGTACGCTATTTGA

4112.2
15 ATGAGTACTTTAGCAAAAATAGAAGCGCTCTTGTGTTAGCGGGTGAAGATGGGATTCCGGGTCGCCAGTTAGCT
GAACTCCTCTCTCTGCCACCGACAGGCATCCAGCAAAAGTTTAGGAAAATAGCCCAGAAAGTATGAAAAGGACCCA
GATTCCAGTTTGGCTTTGATTGAGACAAGTGGTGCTTATAGATTGGTGACCAAGCCTCAATTTGCAGAGATTTTGA
AGGAATACTCTAAGGCGCTATCAACCAGAGCTTGTCTCGGGCTGCCCTTGAGACCTTGTCCATTATTGCCTACAA
ACAGCCGATTACGCGGATAGAAATTGATGCCATCCGTGGAGTTAACTCGAGTGGAGCCTTGGCAAAAGTTGCAAGC
TTTTGACCTGATAAAGGAAGACGGGAAAAAGGAAGTATTGGGGCGCCCCAACCTCTATGTGACTACGGATTATTT
20 CCTAGATTACATGGGGATAAACCATTTAGAGAATTACCAGTGATTGATGAGCTTGAGATTCAAGCCCAAGAAAG
CCAATTATTTGGTGAAAAGGATAGAAGAAGATGAGAATCAATAA

4113.1
25 ATGGATACGATGATTAGTAGATTTTTTCGCCATTTATTTGAAGCCTTAAAAAGTTTGAAACGAAATGGTTGGATGA
CAGTAGCTGCTGTCAAGTTCAGTCATGATTACTTTGACCTTGGTGGAATATTTGCATCTGTTATTTTCAATACAGCG
AAACTAGCTACAGATATTGAAAATAATGTCCGTGTAGTAGTTTATATCCGAAAGGATGTGGAAGATAATAGTCAG
ACAATTGAAAAAGAAGGTCAAACCTGTTACAAATAATGACTACCACAAGGTATATGATTCTTTGAAGAACATGTCT
ACGGTTAAAAAGTGTACCTTTTCAAGTAAAGAACAATATGAAAAATTAACCGAGATAATGGGAGATAATGGGAGTAACTGG
30 AAAATCTTTGAAGGAGATGCCAATCCTCTCTATGATGCCTATATTGTAGAGGCAAAACACTCCAAATGATGTAAAA
ACTATAGCCGAAGATGCTAAAAAAATTGAAGGTGTCTCTGAGGTTCAAGATGGCGGTGCCAATACAGAAAGACTC
TTCAAGTTAGCTTCATTTATCCGTGTTTGGGGACTAGGGATTGCTGCTTTGTTAATTTTTATCGCAGTTTTCTTGAT
TTCAAAATACCATTCTGATTACCATTATTTCCCGCAGTCGCGAAATTCAAATCATGCGCTTGGTCCGAGCTAAAAAC
AGTTATATCCGTGGACCGTTCTTGTAGAAAGAGCCTTTATCGGTTTATTGGGAGCTATCGCACCATCTGTTTGGT
CTTTATTGTTTATCAAAATTGTTTACCAATCTGTCAACAAATCGTTGGTAGGGCAAAATCTATCCATGATTAGTCCA
35 GATTTATTTAGTCCGTTGATGATTGCCCTACTATTTGTGATTGGGGTTTTTCATTGGTTTATTGGGATCAGGAATATC
CATGCGCCGATTCTTGAAGATTTAG

4117.1
40 ATGAAGAAAAGTAAGATTTATTTTTTAGCTCTGCTATTTTTCTTAGCTAGTCCAGAGGGTGCAATGGCTAGTGATG
GTACTTGGCAAGGAAAACAGTATCTGAAAGAAGATGGCAGTCAAGCAGCAAAATGAGTGGGTTTTTGATACTCATT
ATCAATCTTGGTTCTATATAAAAGCAGATGCTAACTATGCTGAAAATGAATGGCTAAAGCAAGGTGACGACTATTT
TTACCTCAAATCTGGTGCTATATGGCCAAATCAGAATGGGTAGAAGACAAGGGAGCCTTTTATTATCTTGACCA
GATGGAAAAGATGAAAAGAAATGCTTGGGTAGGAACCTTCTATGTTGGTGCAACAGGTGCCAAAGTAATAGAAGAC
45 TGGGTCTATGATTCTCAATACGATGCTTGGTTTTATATCAAAGCAGATGGACAGCACGCAGAGAAAGAATGGCTC
CAAATTAAGGGAAGGACTATTATTTCAAATCCGGTGGTTATCTACTGACAAGTCAGTGGATTAATCAAGCTTATG
TGAATGCTAGTGGTGCCAAAGTACAGCAAGTTGGCTTTTTGACAAAACAATACCAATCTTGGTTTTACATCAAAAGA
AAATGGAACTATGCTGATAAAGAATGGATTTTCGAGAATGGTCACTATTATTATCTAAAATCCGGTGGCTACATG
GCAGCCAATGAATGGATTTGGGATAAGGAATCTTGGTTTTATCTCAAATTTGATGGGAAAATGGCTGAAAAGAA
TGGGTCTACGATTCTCATAGTCAAGCTTGGTACTACTTCAAATCCGGTGGTTACATGACAGCCAATGAATGGATTT
50 GGGATAAGGAATCTTGGTTTTATCTCAAATCTGATGGGAAAATAGCTGAAAAGAATGGGTCTACGATTCTCATA
GTCAAGCTTGGTACTACTTCAAATCCGGTGGTTACATGACAGCCAATGAATGGATTTGGGATAAGGAATCTTGGTT
TTACCTCAAATCTGATGGGAAAATAGCTGAAAAGAATGGGTCTACGATTCTCATAGTCAAGCTTGGTACTACTTC
AAATCTGGTGGCTACATGGCGAAAATGAGACAGTAGATGGTTATCAGCTTGGAAAGCGATGGTAAATGGCTTGG
GAAAAAACTACAAATGAAAATGCTGCTTACTATCAAGTAGTGCCCTGTTACAGCCAATGTTTATGATTACAGATGGT
55 AAAAGCTTTCCTATATATCGCAAGGTAGTGTCTGATGGCTAGATAAGGATAGAAAAAGTGATGACAAGCGCTTGG
CTATTACTATTTCTGGTTTGTCAAGCTATATGAAAACAGAAGATTTACAAGCGCTAGATGCTAGTAAGGACTTTAT
CCCTTATTATGAGAGTGATGGCCACCGTTTTATCACTATGTGGCTCAGAATGCTAGTATCCCAAGTACTTCTCAT
CTTCTGATATGGAAGTAGGCAAGAAATATTATTCGGCAGATGGCCTGCATTTTGATGGTTTTAAGCTTGAGAATC
CCTTCTTTTCAAAGATTTAACAGAGGCTACAAACTACAGTGCTGAAGAATTGGATAAGGTATTTAGTTTGCTAAA
CATTAACAATAGCCTTTTGGAGAACAAAGGGCGCTACTTTAAGGAAGCCGAAGAACATTACCATATCAATGCTCTT
60 TATCTCCTTGCCCATAGTGCCCTAGAAAGTAAGTGGGGAAGAAGTAAAATTGCCAAAGATAAGAATAATTTCTTTG
GCATTACAGCCTATGATACGACCCCTTACCTTTCTGCTAAGACATTTGATGATGTGGATAAGGGAATTTAGGTGC
AACCAAGTGGATTAAGGAAAATTTATATCGATAGGGGAAGAACTTTCTTGGAACAAGGCTTCTGGTATGAATGT
GGAATATGCTTCAGACCCTTATTGGGGCGAAAAAATTGCTAGTGTGATGATGAAAATCAATGAGAAGCTAGGTGG
65 CAAAGATTAG

CTAGAGACAGATCCTTATATCACCTCAGGACGCCATCTGGTAGTACCCAAGGACGCGCCGAATCAAAAGGTGACA
GCCAGTCTGCCAGTGGCGCATGAACTGGAGAGTTGCAGAGAGATATCCTTgCTTGACGGCGGGTATGGATGTCTT
GA

5

4122.1

10

ATGAAGAAAAAGATACCTAGTCTTGACAGCTTTGCTAGCCTTGAGTCTAGCAGCTTGTTCACAAGAAAAACAAAA
AATGAAGATGGAGAACTAAGACAGAACAGACAGCCAAAGCTGATGGAACAGTCGGTAGTAAGTCTCAAGGAGC
TGCCCAAGAAAGCAGAAAGTGGTCAATAAAGGTGATTACTACAGCATTCAAGGGAAATACGATGAAATCATCGT
AGCCAACAAACACTATCCATTGTCTAAAGACTATAATCCAGGGGAAAAATCCAACAGCCAAGGCAGAGTTGGTCAA
ACTCATCAAAGCGATGCAAGAGGCAGGTTTCCCTATTAGTGATCATTACAGTGGTTTTAGAAGTTATGAACTCAG
ACCAAGCTCTATCAAGATTATGTCAACCAAGATGGAAGGCAGCAGCTGACCGTTACTCTGCCCGTCTGGCTAT
AGCGAACACCAGACAGGCTTGGCCTTTGATGTGATTGGGACTGATGGTGATTGGTGACAGAAGAAAAAGCAGCC
CAATGGCTCTTGGATCATGCAGCTGATTATGGCTTTGTGTCCGTTATCTCAAAGGCAAGGAAAAAGGAAACAGGCT
ATATGGCTGAAGAATGGCACCTGCGTTATGTAGGAAAAGAAGCTAAAGAAATTGCTGCAAGTGGTCTCAGTTTGG
AAGAATACTATGGCTTTGAAGGCGGAGACTACGTCGATTAA

15

4125.6

20

ATGCGTAAATTCTTAATTATTTTGTGCTACCAAGTTTTTTGACCATTTCAAAAGTCGTTAGCACAGAAAAAGAAG
TCGTCTATACTTCGAAAGAAATTTATTACCTTTCACAATCTGACTTTGGTATTTATTTAGAGAAAAATTAAGTTCT
CCCATGGTTTTATGGAGAGGTTCTCTGTTTATGCGAATGAAGATTTAGTAGTGGAATCTGGGAAATTGACTCCCAAAA
CAAGTTTTCAAATAACCGAGTGGCGCTTAAATAACAAGGAATTCAGTATTTAAGCTATCAAATCATCAATTTAT
AGCTGCGGCAAAACGATTTTTATATGATCAATCAGAGGTAACCTCAACAATAAAAAAAGTATGGTTAGAATCTGA
CTTTAAACTGTACAATTAGTCTTATGATTTAAAAGAAATCAATCATCTTATCAGCTTATTCGCAAGTATCAATC
GACAAGACCATGTTTGTAGAAGGAAGAGAATTTCTACATATTGATCAGGCTGGATGGGTAGCTAAAGAATCAACT
TCTGAAGAAGATAATCGGATGAGTAAAGTTCAAGAAATGTTATCTGAAAAATATCAGAAAGATTCTTTCTCTATTT
ATGTTAAGCAACTGACTACTGAAAAAGAAGCTGGTATCAATCAAGATGAAAAGATGTATGCAGCCAGCGTTTTGA
AACTCTCTTATCTCTATTATACGCAAGAAAAAATAAATGAGGGTCTTTATCAGTTAGATACGACTGTAAAAATACGT
ATCTGCAGTCAATGATTTTCCAGGTTCTTATAAACAGAGGGAAGTGGTAGTCTTCTAAAAAAGAAGATAATAA
AGAATATTCTTTAAAGGATTTAATTACGAAAGTATCAAAAGAACTGATAATGTAGCTCATAATCTATTGGGATAT
TACATTTCAAACCAATCTGATGCCACATTCAAATCCAAGATGTCTGCCATTATGGGAGATGATTGGGATCCAAAAAG
AAAAATTGATTTCTTAAAGATGGCCGGGAAGTTTATGGAAGCTATTTATAATCAAAATGGATTTGTGCTAGAGTC
TTTGACTAAAAACAGATTTTGATAGTCAGCGAATTGCCAAAGGTGTTTCTGTTAAAGTAG
CTCATAAAATTGGAGATGCGGATGAATTTAAGCATGATACGGGTGTTGTCTATGCAGATTCTCCATTTATTCTTTCT
ATTTTCACTAAGAATTCTGATTATGATACGATTTCTAAGATAGCCAAGGATGTTTATGAGGTTCTAAAAATGA

35

4125.7

40

ATGAAAAAACAAAAATAATGGTTTAAATAAAAATCCTTTTCTATGGTTATTATTTATCTTTTCTTGTGACAGGATT
CCAGTATTTCTATTCTGGGAATAACTCAGGAGGAAGTCAGCAAACTCAACTATACTGAGTTGGTACAAGAAATTAC
CGATGGTAATGTAAAGAATTAACCTACCAACCAATGGTAGTGTTATCGAAGTTTCTGGTGTCTATAAAAAATCCT
AAAAACAAGTAAAGAAGAAACAGGTATTCAGTTTTACGCCATCTGTTACTAAGGTAGAGAAATTTACCAGCACT
ATTCTTCTGCATACTACCGTATCAGAATTGCAAAACTTGCTACTGACCATAAAGCAGAAGTAACTGTTAAGC
ATGAAAGTTCAAGTGGTATATGGATTAATCTACTCGTATCCATTGTGCCATTTGGAATTTCTATTCTTCTCTATTCT
TCTATGATGGGAAATATGGGAGGAGGCAATGGCCGTAATCCAATGAGTTTGGACGTAGTAAGGCTAAAGCAGCA
AATAAAGAAGATATTAAAGTAAGATTTTCAGATGTTGCTGGAGCTGAGGAAGAAAAACAAGAACTAGTTGAAGTT
GTTGAGTTCTTAAAGATCCAAAACGATTACAAAACTTGGAGCCGTATTCCAGCAGGTGTTCTTTTGGAGGGAC
CTCCGGGGACAGGTAACCTTTGCTTGGTAAGGCAGTCGCTGGAGAAGCAGGTGTTCCATTCTTTAGTATCTCAGG
TTCTGACTTTGTAGAAATGTTTGTGCGAGTTGGAGCTAGTCGTGTTCTCTTTTGGAGGATGCCAAAAAGCA
GCACCAGCTATCATCTTATCGATGAAATGATGCTGTTGGACGTCAACGTGGAGTCGCTTCCGCGGAGGTAATG
ACGAACGTGAACAAACCTTGAACCAACTTTTGATTGAGATGGATGGTTTTGAGGGAAATGAAGGGATTATCGTCA
TCGCTGCGACAAACCGTTAGATGTACTTGACCCTGCCCTTTTGCCTCCAGGACGTTTTGATAGAAAAGTATTGGT
TGGTCGTCCTGATGTTAAAGGTCGTGAAGCAATCTTGAAAGTTACGCTAAGAATAAGC
CTTTAGCAGAAGATGTTGATTTGAAATTAGTGGCTCAACAACTCCAGGCTTTGTTGGTGCTGATTTAGAGAATGT
CTTGAATGAAGCAGCTTTAGTTGCTGCTCGTCGCAATAAATCGATAATTGATGCTTCAGATATTGATGAAGCAGAA
GATAGAGTTATTGCTGGACCTTCTAAGAAAGATAAGACAGTTTCACAAAAAGAACGAGAATTGGTTGCTTACCAT
GAGGCAGGACATACCATTTGGTCTAGTCTTGTGCAATGCTCGCGTTGTCCATAAGGTTACAATTGTACCACGCG
GCCGTGCAGGCGGATACATGATTGCACCTCCTAAAGAGGATCAAAATGCTTCTATCTAAAGAAGATATGAAAGAGC
AATTGGCTGGCTTAATGGGTGGACGTGTAGCTGAAGAAATTATCTTAAATGTCCAAACCACAGGAGCTTCAAAACG
ACTTTGAACAAGCGACACAAATGGCAGCTGCAATGGTTACAGAGTACGCTATGAGTGAACAACTTTGGCCAGTAC
AATATGAAGGAACCATGCTATGCTTGGTGACAGAGTCTCAAAAAATCAATTTTCAAGCAACAAACAGCTTATGAAA
TTGATGAAGAGGTTCTGTTTCAATTATTAATGAGGCACGAAATAAAGCTGCTGAAATTATTTCAGTCAATCGTGAAC
TCACAAAGTTAATTGCAGAAAGCATTATTGAAATACGAAACATTGGATAGTACACAAATTAAGGCTCTTACGAAAC
AGGAAAGATGCCGTAAGCAGTAGAAGAGGAATCTCATGCACTATCCTATGATGAAGTAAAGTCAAAAAATGAATGA
CGAAAAATAA

65

4125.10

5 ATGAGGGAACAGATTTTTTAAATCATTTTTCTCAAGAAGGGATATTTCAAAAAGCATGCTAAGGCGGTTCTAGCTC
TTTCTGGTGGATTAGATTCCATGTTTCTATTTAAGGTATTGTCTACTTATCAAAAAGAGTTAGAGATTGAATTGATT
CTAGCTCATGTGAATCATAAGCAGAGAATTGAATCAGATTGGGAAGAAAAGGAATTAAGGAAGTTGGCTGCTGAA
10 GCAGAGCTTCTATTTATATCAGCAATTTTTCAGGAGAATTTTCAGAAGCGCGTGCACGAAATTTTCGTTATGATT
TTTTCAAGAGGTCATGAAAAAGACAGGTGCGACAGCTTTAGTCACTGCCACCATTGCTGATGATCAGGTGGAAA
CGATTTTTATGCGCTTGATTTCAGGAACTCGCTTGCCTATCTATCAGGAATTAAGGAGAAGCAAGTAGTCGGAGA
GATAGAAATCATTTCGTCCTTCTTGCATTTTCAGAAAAAGACTTTCCATCAATTTTTCACTTTGAAGATACATCA
15 AATCAGGAGAATCATTATTTTCGAAATCGTATTCGAAATTTCTTACTTACCAGAATTGGAAAAAGAAAATCCTCGAT
TTAGGGATGCAATCTTAGGCATTGGCAATGAAATTTTAGATTATGATTGGCAATAGCTGAATTATCAACAATAT
TAATGTGGAAGATTTACAGCAGTTATTTTCTTACTCTGAGTCTACACAAAGAGTTTACTTCAAACCTTATCTGAATC
GTTTTCCAGATTTGAATCTTACAAAAGCTCAGTTTGTCTGAAGTTTCAGCAGATTTTAAAAATCTAAAAGCCAGTATCG
TCATCCGATTAAAAATGGCTATGAATTGATAAAAGAGTACCAACAGTTTCAGATTTGTAAAAATCAGTCCGAGGCT
20 GATGAAAAAGGAAGATGAACCTGTGTACACTATCAAAATCAGGTAGCTTATCAAGGATATTTATTTTCTTTGGAC
TTCCATTAGAAGGTGAATTAATTCAACAAATACCTGTTTCAGTGAAACATCCATACACATTCGTCATCGAAAAAC
AGGAGATGTTTGTATAAAAATGGGCATAGAAAAAACTCAGACGTTTATTTATTG
ATTTGAAATCCCTATGGAAGGAAAACTCTGCTCTTATTATTGAGCAATTTGGTGAAATGTCTCAATTTTGGG
AATTGCGACCAATAATTTGAGTAAAAAAACGAAAAATGATATAATGAACACTGTACTTTATATAGAAAAAATAGA
TAGGTAA

4126.1

25 ATGAAGCGTTCTTCTCTTTAGTTAGAATGGTTATTTCCATCTTTCTGGTCTTTCTCATTCTCCTAGCTCTGGTTGGA
ACTTTCTACTATCAATCAAGTTCTTCAGCCATTGAGGCCACCATTGAGGGCAACAGCCAAACGACCATCAGCCAG
ACTAGCCACTTTTATTCAGTCTTATATCAAAAAACTAGAAACCACTCGACTGGTTTGACCCAGCAGACGGATGTTT
TGGCCTATGCTGAGAATCCAGTCAAGACAAGGTGAGGGAATCCGAGATTTGTTTTGACCATCTTGAAGTCAGA
TAAGGACTTGAAAACTGTTGTGCTGGTGACCAAACTGGTCAGGTCATTTCTACAGATGACAGTGTGCAGATGAA
AACTTCTCTGATATGATGGCTGAGGATTGGTACCAAAAGGCCATTTCATCAGGGAGCTATGCCTGTTTGAAGTCCA
30 GCTCGTAAATCAGATAGTCAAGTGGTCAATTTCTGTCACTCAAGAACTTGTGATGCAAAAGGGAGCCAATCTTGGTG
TGCTTCGTTTGGATATTTCTTATGAAACTCTGGAAGCCTATCTCAATCAACTCCAGTTGGGGCAGCAGGGCTTTGC
CTTCATTATCAATGAAAACCATGAATTTGTCTACCATCTCAACACACAGTTTATAGTTCTGTCTAGCAAAATGGAG
GCTATGAAACCCCTACATCGATACAGGTGAGGTTTATACTCTGGTCACAAATCCTACGTCAAGAGAAGATT
GCAGGAACTGATTGGACGGTGTCTGGCGTGTCTATTGGAAGGTTAGACCAGGTTCCGAGTCAGCTCTTGTGG
ACCTTGCTTGGGGCCAGTGTACATCTCTTCTGTCTGTCTGTCTAGTGTGGTTTCAGTCTTAAACGCTGGATTGC
35 TCCTTTGAAGGATTTGAGAGAAACCATGTTTGGAAATTTGCTTCTGGTGTCTCAAAATCTTCGTGCCAAGGAAGTTGGT
GCCTATGAACTGAGAGAAGTAACCTCGCAATTTAATGCTATGTTGGATCAGATTGATCAGTTGATGTTGATGCTATTC
GTAGCCAGGAAGAAACGACCCGTCAGTACCAACTTCAAGCCCTTTTCAGCCAGATTAATCCACATTTCTCTATAA
CACTTTGGACACCATCTCTGGATGGCTGAATTTCTGATAGTCAAGCAGTGGTGCAGGTGACCAAGTCTCTTGGCA
ACCTATTTCCGCTTGGCGCTCAATCAAGGCAAGGACTTGATTGTCTCTCTGACGAAATCAATCATGTCCGCCAGT
40 ATCTCTTTATCCAGAAACAACGCTATGGAGATAAGCTGGAATACGAAATTAATGAAAATGTTGCCTTTGATAATTT
AGTCTTACCCAAGCTGGTCTACAACCCCTTGTAGAAAATGCTCTTTACCATGGCATTAAAGGAAAAGGAAGGTCA
GGGCCATATTAACCTTTCTGTCCAGAAACAGGATTGGGATTTGGTCATCCGTATTGAGGATGATGGCGTTGGCTTC
CAAGATGCTGGTATGATAGTCAAGTCAACTCAACGCTGGGGGAGTTGGTCTTCAAAATGTGATCAACGGCTC
AACTTTCATTTTGGAGCCAATTACCATATGAAGATTGATTCTAGACCCCAAAAAGGACGAAAGTTGAAATATAT
45 ATAAATAGAATAGAAACTAGCTAA

4126.7

50 ATGAAGCGTTCTTCTCTTTAGTTAGAATGGTTATTTCCATCTTTCTGGTCTTTCTCATTCTCCTAGCTCTGGTTGGA
ACTTTCTACTATCAATCAAGTTCTTCAGCCATTGAGGCCACCATTGAGGGCAACAGCCAAACGACCATCAGCCAG
ACTAGCCACTTTTATTCAGTCTTATATCAAAAAACTAGAAACCACTCGACTGGTTTGACCCAGCAGACGGATGTTT
TGGCCTATGCTGAGAATCCAGTCAAGACAAGGTGAGGGAATCCGAGATTTGTTTTGACCATCTTGAAGTCAGA
TAAGGACTTGAAAACTGTTGTGCTGGTGACCAAACTGGTCAGGTCATTTCTACAGATGACAGTGTGCAGATGAA
AACTTCTCTGATATGATGGCTGAGGATTGGTACCAAAAGGCCATTTCATCAGGGAGCTATGCCTGTTTGAAGTCCA
55 GCTCGTAAATCAGATAGTCAAGTGGTCAATTTCTGTCACTCAAGAACTTGTGATGCAAAAGGGAGCCAATCTTGGTG
TGCTTCGTTTGGATATTTCTTATGAAACTCTGGAAGCCTATCTCAATCAACTCCAGTTGGGGCAGCAGGGCTTTGC
CTTCATTATCAATGAAAACCATGAATTTGTCTACCATCTCAACACACAGTTTATAGTTCTGTCTAGCAAAATGGAG
GCTATGAAACCCCTACATCGATACAGGTGAGGTTTATACTCTGGTCACAAATCCTACGTCAAGAGAAGATT
GCAGGAACTGATTGGACGGTGTCTGGCGTGTCTATTGGAAGGTTAGACCAGGTTCCGAGTCAGCTCTTGTGG
ACCTTGCTTGGGGCCAGTGTACATCTCTTCTGTCTGTCTGTCTAGTGTGGTTTCAGTCTTAAACGCTGGATTGC
60 TCCTTTGAAGGATTTGAGAGAAAACCATGTTTGGAAATTTGCTTCTGGTGTCTCAAAATCTTCGTGCCAAGGAAGTTGGT
GCCTATGAACTGAGAGAAGTAACCTCGCAATTTAATGCTATGTTGGATCAGATTGATCAGTTGATGGTAGCTATTC
GTAGCCAGGAAGAAACGACCCGTCAGTACCAACTTCAAGCCCTTTTCAGCCAGATTAATCCACATTTCTCTATAA
CACTTTGGACACCATCTCTGGATGGCTGAATTTCTGATAGTCAAGCAGTGGTGCAGGTGACCAAGTCTCTTGGCA
ACCTATTTCCGCTTGGCGCTCAATCAAGGCAAGGACTTGATTGTCTCTCTGACGAAATCAATCATGTCCGCCAGT
65 ATCTCTTTATCCAGAAACAACGCTATGGAGATAAGCTGGAATACGAAATTAATGAAAATGTTGCCTTTGATAATTT

AGTCTTACCCAAGCTGGTCCTACAACCCCTTGTAGAAAAATGCTCTTACCATGGCATTAAAGGAAAAGGAAGGTCA
GGGCCATATTAACCTTTCTGTCCAGAAACAGGATTCCGGGATTGGTCATCCGTATTGAGGATGATGGCGTTGGCTTC
CAAGATGCTGGTGATAGTAGTCAAAGTCAACTCAAACGTGGGGGAGTTGGTCTTCAAAATGTGATCAACGGCTC
AACTTCATTTGGAGCCAATTACCATATGAAGATTGATTCTAGACCCCAAAAAGGGACGAAAGTTGAAATATAT
ATAAATAGAATAGAACTAGCTAA

4127.4

ATGTTTTTTAAATTATTAAGAGAAGCTCTTAAAGTCAAGCAGGTTTCGATCAAAAAATTTTATTACAATTTTTATCGT
TTTGGTCTTTTCGTACCGAACTAGCATTACAGTTCCTGGTGTGAATGCCAATAGCTTGAATGCTTTAAGTGGATTAT
CCTTCTTAAACATGTTGAGCTTGGTGTCCGGGGAATGCCCTAAAAAACTTTTCGATTTTGGCCCTAGGAGTTAGTCC
CTATATCACCGCTTCTATTGTTGTCCAACCTCTTGCAAATGGATATTTTACCCAAGTTTGTAGAGTGGGGTAAACAA
GGGGAAGTAGGTGCAAGAAAAATTGAATCAAGCTACTCGTTATATTGCTCTAGTTCTCGCTTTTGTGCAATCTATCG
GGATTACAGCTGGTTTTAATACCTTGGCTGGAGCTCAATTGATTAAAACTGCTTTAACTCCACAAGTTTTCTGAC
GATTGGTATCATCTTAACAGCTGGTAGTATGATTGTCACTTGGTTGGGTGAGCAAATTACAGATAAAGGGATACGGA
AACGGTGTTTCCATGATTATCTTGGCCGGGATTGTTTCCTCAATTCCAGAGATGATTCAAGGGCATCTATGTGGACT
ACTTTGTGAACGTCCCAAGTAGCCGTATCACTTCATCTATCATTTTCGTAATCATTTTGATTATTACTGTATTGTTG
ATTATTACTTTACAACCTTATGTTCAACAAGCAGAATACAAAAATCCAATCCAATATACTAAGGTTGCACAAGGTG
CTCCATCTAGCTCTTACCTTCCGTTAAAAGTAAACCCTGCTGGAGTTATCCCTGTTATCTTTGCCAGTTTCGATTACT
GCAGCGCTGCGGCTATTCTTCAGTTTGTAGTGCCACAGGTCATGATTGGGCTTGGGTAAAGGGTAGCACAAGAGA
TGTTGGCAACTACTTCTCAACTGGTATTGCCATGATGCTTGTGATTATCTCTTTACATTCTCTATACGTTTG
TACAGATTAACTCTGAAAAAGCAGCAGAGACCTACAAAAAGAGTGGTGCCTATATCCATGGAGTTCGTCTGGTAA
AGGTACAGAAGAATATATGTCTAACTTCTTCGTCGCTTGAACCTGTTGGTTCCCTCTTCCTTGGTGTGA

4127.5

ATGGATATTAGACAAGTTACTGAAACCATCGCCATGATTGAGGAGCAAACTTCGATATTAGAACCATTACCATG
GGGATTTCTCTTTGGACTGTATCGATCCAGATATCAATCGTCTGCGGAGAAAAATCTATCAAAAAATTACGACAA
AGGCGGCTAATTTAGTAGCTGTTGGTGATGAAATTCGCGCTGAGTTGGGAATTCCTATCGTTAATAAGCGTGTATC
GGTGACACCTATTTCTCTGATTGGGGCAGCGACAGATGCGACGGACTACGTGGTTCTGGCAAAAGCGCTTGATAA
GGCTGCGAAAGAGATTGGTGTGGACTTTATTGGTGGTTTTCTGCCTTAGTACAAAAAGGTTATCAAAAGGGAGAT
GAGATTCTCATCAATTCATTCTCGCGCTTGGCTGAGACGGATAAGGTCTGCTCGTCAGTCAATATCGGCTCAA
CCAAGTCTGGTATTAATATGACGGCTGTGGCAGATATGGGACGAATTATCAAGGAAACAGCAAATCTTTCAGATA
TGGGAGTGGCCAAGTTGGTTGTATTGCTAATGCTGTTGAGGACAATCCATTTATGGCGGGTGCCTTTCATGGTGT
TGGGGAAGCAGATGTTATCATCAATGTCGGAGTTTCTGGTCTGGTGTGTGAAACGTGCTTTGAAAAAAGTTTCGT
GGACAGAGCTTTGATGTAGTAGCCGAAACAGTTAAGAAAACTGCCTTTAAAAATCACTCGTATCGGTCAATTGGTGT
GTCAAAATGGCCAGTGAGAGACTGGGTGTGGAGTTTGGTATTGTGGACTTGAGTTTGGCACCAACCCTGCGGTTGG
AGACTCTGTGGCAGCTGTCTTGAAGGAAATGGGGCTAGAAACAGTTGGCACGCATGGAACGACGGGTGCCCTTGGC
CCTCTTGAACGACCAAGTTAAAAAGGGTGGAGTGATGGCTGCAACCAAGTCGGTGGTTTATCTGGTGCCTTTATC
CCTGTTTCTGAGGATGAAGGAATGATTGCTGCAGTGCAAAATGGCTCTCTTAATTTAGAAAAACTAGAAGCTATGA
CGGCTATCTGTCTGTGGATTGGATATGATTGCCATCCCAGAAAGATACGCCTGCTGAAACTATTGCGGCTATGAT
TGCGGATGAAGCAGCAATCGGTGTTATCAACATGAAACAACAGCTGTTTCGTATCATTCCCAAAGGAAAAAGAGG
CGATATGATTAGTTTGGTGGTCTATTAGGAACCTGACCCGTTATGAAGGTTAATGGGGCTTCGTCTGTGCACTTC
ATCTCTCGCGGTGGACAAATCCCAGCACCAATTCATAGTTTTAAAAATTAA

4128.1

ATGACACAGATTATTGATGGGAAAGCTTTAGCGGCCAAATTGCAGGGGCAGTTGGCTGAAAAGACTGCAAAATTA
AAGGAAGAAACAGGTCTAGTGCCTGGTTTGGTAGTGATTGTTGGTTGGGGACAATCCAGCCAGCCAAGTCTACGTT
CGCAACAAGGAGAGGTACAGCCCTTGGCGCTGGTTTCCGTAGCGAAGTAGTACGGGTTCCAGAGACCATTACTCAA
GAGGAATTGTTAGACCTGATTGCTAAATACAATCAGGATCCAGGCTTGGCATGGGATTTTGGTTCAAGTTGCCATTAC
CAAAACACATTGATGAAGAGGGCGGTTCTATTGGCTATTGACCCAGAAAAGGATGTGGATGGTTTCCATCCTCTAA
ACATGGGGCGTCTTTGGTCTGGTCATCCAGTCATGATTCTTCGACACCCGGCAGGAATTATGGAATGTTCCATTGA
ATATGGGATTGACTTGAAGGTAATAATGCAGTCGTATCGGTGATCCAATATTGTGCGAAAACCTATGGCCCA
GCTTCTTTTGGCAAGAATGCAACAGTAACCTTGACTCACTCACGTACTCATAATCTTTCCAAGGTGGCTGCAAAA
GCAGATATTCTGGTTGTTGCAATCGGTGCTGCCAAGTTTGTGACTGCTGACTTTGTCAAACAGGTGCGGTAGTCA
TTGACGTTGGGATGAACCGCATGAAAATGGTAAGCTCTGTGGGGATGTTGATTATGAGGCGGTTGCCCACTTGC
TAGCCACATTACGCCAGTCCCTGGAGGTGTCGGTCTATGACCATTACTATGCTGATGGAGCAACCTATCAGGCA
GCACTTAGGACATTGGATAGAAAATAA

4128.2

ATGTCTAAATTTAATCGTATTCATTTGGTGGTACTGGATTCTGTAGGAATCGGTGCAGCACCAGATGCTAATAACT
TTGTCAATGCAGGGGTTCCAGATGGAGCTTCTGACACACTGGGACACATTTCAAAAACAGTTGGTTTGAATGTCCC
AAACATGGCTAAAATAGGTCTTGGAAATATTCCTCGTGAAACTCCTCTTAAGACTGTAGCAGCTGAAAGCAATCC
AACTGGATATGCAACAAAATTAGAGGAAGTATCTCTTGGTAAGGATACTATGACTGGACACTGGGAAATCAGTGGG
ACTCAACATTACTGAGCCTTTCGATACTTTCTGGAACCTGGTATCCAGAAAGAAATCCTGACAAAAATCGAAGAATTC
TCAGGACGCAAGGTTATTCGTGAAGCCAACAAACCTTATTCAGGAACGGCTGTTATCTATGATTTTGACCACGTC

AGATGGAACTGGAGAGTTGATTATCTATACTTCAGCTGACCCTGTTTTGCAGATTGCTGCCACGAAGACATTAT
 TCCTTTGGATGAATTGTACCGTATCTGTGAATACGCTCGTTCGATTACCCTTGAGCGTCTGCCCTTCTGGTTCGCA
 TCATTGCTCGCCCTTATGTAGGTGAACCAAGTAACCTTACTCGTACGGCAAACCGTCGTGACTTGGCTGTATCTCC
 ATTTTTCCCACTGTTTTGGATAAAATGAATGAGGCTGGTATCGATACTTATGCTGTGGGTAAAATCAACGATATC
 5 TTTAACGGTGTGGTATCAACCATGACATGGGTCAACAAGTCAAATAGTCATGGAATTGATACACTATTGAAG
 ACTATGGGACTTGCTGAGTTTGAAAAAGGATTCTCATTCAAAACCTAGTTGACTTTGATGCCCTTACGGCCATC
 GTCGTAATGCTCACGGTTACCGTGATTGCTTGCATGAGTTTGATGAACGCTTACCTGAAATTATCGCAGCTATGAG
 AGAGAAATGACCTTCTCTTGATTACTGCGGACCATGGAATGACCAACGTATGCAGGAACGGATCACACTCGGGA
 ATATATTCCATTGTTGGCCTATAGCCCTGCCTTTAAAGGAAATGGTCTCATTCCAGTAGGACATTTTGCAGATATTT
 10 CAGCGACTGTTGCCGATAACTTTGGTGTGGAACCTGCTATGATTGGGGAAAGTTTCTTAGATAAAATTGGTATAA

4129.2

ATGTTTATTTCCATCAGTGCTGGAATTGTGACATTTTACTAACTTTAGTAGAAAATCCGGCCTTTATCCAATTTTA
 TAGAAAGGCGCAAATTACAGGCCAGCAGATGCATGAGGATGTCAAACAGCATCAGGCAAAAGCTGGGACTCCTA
 15 CAATGGGAGGTTTGGTTTTCTTGATTACTTCTGTTTTGGTGTCTTCTTTTCGCCCTATTTAGTAGCCAATTCAGCA
 ATAAATGTGGGAATGATTTTGTTCATCTTGGTCTGTATGGCTTGGTTCGGATTTTTAGATGACTTTCTCAAGGTCTTT
 CGTAAATCAATGAGGGGCTTAATCCTAAGCAAAATAGCTCTCAGCTTCTAGGTGGAGTTATCTTCTATCTTT
 TCTATGAGCGCGGTGGCGATATCCTGTCTGTCTTTGGTTATCCAGTTCATTTGGGATTTTTCTATATTTTCTCGCT
 CTTTTCTGGCTAGTCGGTTTTTCAAACGCAGTAACTTGACAGACGGTGTGACGGTTTAGCTAGTATTTCCGTTGT
 20 GATTAGTTTGTCTGCCTATGGAGTTATTGCCTATGTGCAAGGTGAGATGGATATTCTTCTAGTGATTCTTGCCATGA
 TTGGTGGTTTTGCTCGGTTTTCTTCATCTTTAACCATAAAGCCTGCCAAGGTCTTTATGGGTGATGTGGGAAGTTTGGCC
 CTAGGTGGGATGCTGGCAGCTATCTCTATGGCTCTCCACCAAGAAATGGACTCTCTTGATTATCGGAATTGTGTATG
 TTTTTGAAACAACCTCTGTTATGATGCAAGTCAGTTATTTCAAACCTGACAGGTGGTAAACGTATTTCCGTATGAC
 25 CCCTGTACATCACCATTGAGCTTGGGGATTGTCTGGTAAAGGAAATCCTTGAGCGAGTGGAAGGTTGACTTC
 TTCTTTGGGGAGTGCGGACTTCTAGCAAGTCTCCTGACCCTAGCAATTTATATTTGATGTAA

4133.1

TTGTTTAAGAAAAATAAAGACATTCTTAATATTGCATTGCCAGCTATGGGTGAAAACTTTTTGCAGATGCTAATGG
 GAATGGTGACAGTTATTTGGTGTCTCATTTAGGATTGATAGCTATTTCAAGGGTTTCAGTAGCTGGTAATATTAT
 30 CACCATTTATCAGGCGATTTTCATCGCTCTGGGAGCTGCTATTTCCAGTGTTATTTCAAAAAGCATAGGGCAGAAA
 GACCAGTCGAAGTTGGCCTATCATGTGACTGAGGCGTTGAAGATTACCTTACTATTAAGTTTCTTTTAGGATTTTT
 GTCCATCTTCGCTGGGAAAAGAGATGATAGGACTTTTGGGGACGGAGAGGGATGTAGCTGAGAGTGTTGGTGGACTGTA
 TCTATCTTTGGTAGGCGGATCGATTGTTCTCTTAGGTTTAAATGACTAGTCTAGGAGCCTTGATTCTGTCAACGCAT
 35 AATCCACGTCTGCCTCTCTATGTTAGTTTTTATCCAATGCCTTGAATATTCTTTTTCAAGTCTAGCTATTTTTGTT
 CTGGATGGGGATAGCTGGTGTGCTTGGGGGACAATTGTGTCTCGTTTGGTTGGTCTTGTGATTTTGGTCTGCT
 AATTAATAACTGCCTTATGGGAAGCCAACCTTTGGTTTAGATAAGGAACTGTTGACCTTGGCTTTACCAGCAGCTGG
 AGAGCGACTTATGATGAGGGCTGGAGATGTAGTGATCATTGCCTTGGTCTGTTCTTTTGGGACGGAGGCAGTTGCT
 GGGAAATGCAATCGGAGAAGTCTTGACCCAGTTTAACTATATGCCTGCCTTTGGCGTCGCTACGGCAACGGTCATGC
 40 TGTGGCCCCGAGCAGTTGGAGAGGATGATTGGAAAAGAGTTGCTAGTTTGAATAACAAACCTTTTGGCTTCTCT
 GTTCTCATGTTGCCCTGTCTTTAGTATATATGTCTTGGGTGTACCATTAACTCATCTCTATACGACTGATTCTC
 TAGCGGTGGAGGCTAGTGTCTAGTGACACTGTTTTCATCTACTTGGGACCCTATGACGACAGGAACAGTCATCTA
 TACGGCAGCTCTGGCAGGATTAGGAAATGCACGCCTCCCTTTTATGCGACAAGTATAGGAATGTGGTGTATCCGC
 ATTGGGACAGGATATCTGATGGGGATTGTGCTTGGTTGGGGCTTGCTGGTATTTGGGCAGGGTCTCTCTTGGATA
 45 ATGTTTTCTGCTGTTATTTCTACGCTATCGTTACCAGCGCTATATGAGCTTGAAAGGATAG

4135.2

ATGCAAACTCAAGAAAAACACTCGCAAGCAGCCGTTCTTGGCTTGCAGCACTTACTAGCCATGTACTCAGGATCT
 ATCCTGGTTCCCATCATGATTGCGACAGCCCTTGGCTATTAGCTGAGCAGTTGACCTACCTGATTTCTACAGATA
 50 TCTTCATGTGTGGGTGGCAACCTTCTCCAACCTCAACTCAACAAATACTTTGGGATTGGACTCCAGCTCGTTCT
 TGGAGTTGCATTCCAGTCGGTCGCTCCCTTGATTATGATTGGGCAAAGCCATGGTAGTGGCGCTATGTTTGGTGCC
 CTATCGCATCTGGGATTTACGTGTTCTTGTTTCAGGCATCTTCTCAAAAGTAGCCAATCTCTTCCCATCTATCGT
 AACAGGATCTGTTATTACCACGATTGGTTTAACTTGATCCCTGTGCTATTGGAATATGGGAAATAACGTTCCA
 GAGCCAACCTGGTCAAAGTCTTGTCTGACGCTATTACTGTTCTGATTATCCTCTTGATCAACATCTTACCAAAG
 55 GATTTATCAAGTCTATCTCTATTTGATTGGTCTGGTTGTTGGAACGCCATTGCTGCTACTATGGGCTTGGTGGAC
 TTCTCTCTGTTGCGGTAGCTCCACTTGTCCATGTCCCAACTCCACTCTACTTTGGGATGCCAACCTTTGAAATCTC
 ATCTATTGTATGATGTGTATCATCGCAACGGTGTCTATGGTTGAGTCAACTGGTGTATCTGGCCCTGTCTGATA
 TCACAAAGGATCCAATCGACAGCACGCGCTTCGCAACGGATACCGCGCAGAAGGTTTGGCCGTACTTCTCGGAG
 GAATCTTTAACACCTTCCCTTACACCGGATTTTCAAAAAACGTTGGTTTGGTTAAATTGTCAGGCATCAAAAAACG
 60 CCTGCAATCTACTACGAGCTGGTTTCTGGTTCTCTTGGACTGCTTCTAAGTTTGGCGCCCTTGCCCAATCA
 TTCCAAGCTCCGTCTCGGTGGTGGTAAATGTTTGGTTTGTATCAATTCAAGGGATGCAAACTCTCGC
 CCGTGTGACTTTGCTAACAATGAACACAACCTTCTTATCGCAGCTGTTTCAATCGCTGAGGTGTGGTCTCAAC
 AACAGTAATCTCTTGTGAGCATGCCGACAGCCTTCCAAATGTTCTTCTCAAACGGAATCGTCGTAGCCAGCCTAC
 TCGCTATTGTCTCAATGCCGTATTAAATCATAAAAAGAAATAA

4136.2

ATGAAAGATAGAATAAAAGAATATTTACAAGACAAGGGAAAGGTGACTGTTAATGATTTGGCTCAGGCTTTGGGA
AAAGACAGTTCCAAGGATTTTCGTGAGTTGATTAAAAACCTTGCTTAATGGAAAGAAAGCACCAAATTCGTTTTG
AAGAAGATGGTAGTCTGACATTAGAAATTAAGAAAAACATGAGATTACCCTCAAGGGGATTTTCATGCCCAT
5 AAAATGGCTTTGGCTTTGTTAGTCTGGAAGGCGAGGAGGACGACCTTTTGTAGGGAAAAATGATGTCAACTATGC
TATTGATGGTGATACCGTCGAGGTAGTGATTAAGAAAGTCGCTGACCGCAATAAGGGAAACAGCAGCAGAAAGCCAA
AATTATTGATATCCTAGAACACAGTTTGACAACAGTTTTCGGGCAAATCGTTCTGGATCAGGAAAAACCTAAGTAT
GCTGGCTATATTCGTTCAAAAAATCAGAAAAATCAGTCAACCGATTATGTAAAGAAACAGCCCTAAAAATAGAA
10 GGAACAGAAAGTTCTCAAAGTCTTTATCGATAAAATACCAAGCAAGAAACATGATTTCTTTGTCGCGAGTGTTCTCG
ATGTAGTGGGACACTCAACGGATGTCGGAATTGATGTTCTTGAGGTCTTGGAATCAATGGACATTGTATCCGAGTT
TCCAGAAGCTGTTGTTAAGGAAGCAGAAAGTGTGCTGATGCTCCGCTCTCAAAGGATATGGAAGGTGCTCTGGA
TCTAAGAGATGAAATTACCTTTACCATTGACGGTGCGGATGCCAAGGACTTGGACGATGCAGTGCATATCAAGGC
TCTGAAAAATGGCAATCTGGAGTTTGGGGTTACATCGCAGATGTTTCTTATTATGTGACCGAGGGGCTGCCCTT
GACAAGGAAGCCCTTAACCGTGCAGCTTCTGTTACGTGACAGACCGAGTGTTGCCAATGCTTCCAGAACGACTA
TCAAATGGCATCTGCTCTCTCAATCCCCAAGTTGACCGCTGACCCAGTCTGCTATTAT
15 GGAGATTGATAAACATGGTCTGTTGGTCAACTATACCATACACAAACAGTTATCAAGACCAGTTTTCGTATGACC
TATAGCGATGTCAATGATATCCTAGCTGGCGATGAAGAAAAGAGAAAAGAATATCATAAAATTGTATCAAGTATC
GAACTCATGGCCCAAGCTTCATGAACTTTAGAAAAACATGCGTGTGAAACGTGGAGCTCTCAATTTTGATACCAATG
AAGCGAAGATTTTAGTGGATAAAACAAGGTAAGCCTGTTGATATCGTTCTTCGGCAGCGTGGTATTGCCGAGCGGA
20 TGATTGAGTCTTTTATGTTGATGGCTAATGAAACAGTTGCCGAACATTTACGCAAGTTGGATTGCGCTTTTATCTAT
CGAATTCACGAGGAGCCTAAGGCTGAAAAGGTTTCAGAAAGTATTGATTATGCTTCGAGTTTGGCTTGCGCATT
ATGGAAGTGGCAGTGAGATTAGTCAGGAGGCACTTCAAGACATCATGCGTGCTGTTGAGGGAGAACCTTATGCAG
ATGTATTGTCCATGATGCTTCTTCGCTCTATGCAGCAGGCTCGTTATTCGGAGCACAATCACGGCCACTATGGACT
AGCTGCTGACTATTATACTCACTTTACCAGTCCAATTCGTCGTTATCCAGACCTTCTTGTTCACCGTATGATTGCGG
25 ATTACCGCCGTTCTAAGGAAATAGCAGAGCATTTTGAACAAGTGATTCCAGAGATTGCGACCCAGTCTTCCAACC
GTGAACGTCGTGCCATAGAAGCTGAGCGTGAAGTGAAGCCATGAAAAAGGCTGAGTATATGGAAGAAATACGTGG
GTGAAGAGTATGATGCAGTTGTATCAAGTATTGTCAAATTCGCTCTTTGTGCAATTGCCAACACAGTTGAAGG
CTTGATTACATCACTAATCTGCCTGAATTTTATCAATTCATGAGCGTGATTGACTCTTCGTGGAGAAAAATCA
GGTATCACTTTCCGAGTGGGTACGAGATCCGTATCCGTGTTGAAAGAGCGGATAAAATGACTGGAGAGATTGAT
30 TTTTCATTTCGTACCTAGTGAGTTTGTATGTGATTGAAAAAGGCTTGAACAGTCTAGTCGT
AGTGGCAGAGGGCGTGATTCAAATCGTCGTTCCGATAAGAAGGAAGACAAGAGAAAAATCAGGACGCTCAAATGA
TAAGCCTAAGCTACAAAAAGACAAGAAAGAAAAAGGAAAGAAACCTTTTACAAGGAAGTAGCTAAGAAAG
GAGCCAAGCATGGCAAAGGGCGAGGGAAGGTCGTCGACAAAAATAA

4137.2
35 ATGGGCACAACAGGATTTACAATAATTGACTTAATTATCTTGATTGTTTATTTACTTGCGGTGTTGGTTGCAGGTAT
CTATTTCTCTAAAAAGAGATGAAAGGAAAAGAGTTCTTTAAAGGAGATGGTTCGGTTCCTTGGTATGTTACTTCG
GTATCCATTTTGGCCACAATGCTCAGTCCGATTTCTTTGGGACTCGCTGGTAGCTCTTATGCAGGTAGCTGGAT
TTTATGGTTTGTCTAATTAGGGATGGTAGTAGTATTCCTAGTACAAATTCGTTTATCTTACCTATCTTTGCACGGA
40 TAGACATCGATACGGCATATGATTACTTGGATAAACGTTTTAATTCTAAAGCACTTCGTATTATTTACGACTCTT
GTTTATTATTTATCAATTGGGACGTATGTCTATCATTATGTACCTCCCATCAGCTGGTTTATCAGTATTGACAGGAA
TTGACATCAATATTTTATTGATTATTTGATGGGTGTAGTTGCAATTGTTTATTCTTATACTGGTGGTCTAAAACCGTGT
TTATGGACAGACTTTTCAAGGTGATTCGTGATTGAGTGTGCTGTTTATGCTTTATTTGACTGATTGCTAATAT
TAAAGGTGGCTTTGGTGCAGTAGCAGAAACATTAGCAAACGGGAAATTCCTTGCTGCAAAATGAAAACTTTTCGA
45 TCCTAACTTGCTTTCAAACCTCCATCTTTTAAATGTGATGGGTTACGGCTTTACAATCTTGCTTCCTATGCTTCATC
TCAAGATTTGGTTCAACGTTTTACTACAACACAAAAATTAAGAACTTAATAAGATGTTGTTCAAAAACCGTGT
TTGTCACTTGCAACTGCAACAGTCTTTTACTTGATTGGTACAGGCTTGTACGTATTCTATCAAGTACAAAATGCAG
ATAGTGCAGCTAGCAATATCCCTCAAGACCAAATCTTTATGTACTTTATTGCATACCAAGTTACCAAGTAGGTATCAC
AGGTTTGATCTTGGCAGCGATTATGTCAGCATCTCAATCAACTATTTCAACAGGTTTGAACCTGTTGCAACTTCA
50 TGGACATTGGATATTCAAGATGTCAATTTCAAAAATATGTGACACAATCGTCGTACGAAAAATGCAAAATTCGTAT
CTCTAGCAGTAGGTTTATCTCAATTGGTGTTCATTGTCTGCTCACTCAGATATTAATCTGCATACGAATGG
TTCAATAGTTTCATGGGACTTGTACTTGGTCTACTTGGTGGTGTATTATTCTTGGATTGTTTCTAAAAAGCAAA
TAAACAAGGTGCTTATGCAGCGCTGATTGTATCAACCATGTCATGGTATTTATTAATACTTCTCTCCTCCAACA
GCTGTTAGCTACTGGGCATATTCAATTGATTTCAATCTCTGTATCAGTAGTTTCAGGTTATATTGTATCTGTTCTTAC
55 TGGAAATAAGTATCTGCACCTAAATATACAACGATTATGATATTACAGAAATTAAGCGGATTCAAGTTGGGA
AGTTCGCTCACTAA

4138.1
60 ATGAAATTTAGTAAAAAATATATAGCAGCTGGATCAGCTGTTATCGTATCCTTGAGTCTATGTGCCTATGCACTAA
ACCAGCATCGTTTCGAGGAAAAATAAGGACAATAATCGTGTCTCTTATGTGGATGGCAGCCAGTCAAGTCAGAAAA
GTGAAAACTTGACACCAAGCCAGTTAGCCAGAAAAGGAAGAAATTCAGGCTGAGCAAAATGTAACTCAAAATTACAG
ATCAGGGCTATGTAACGTACACGGTGACCACTATCATTACTATAATGGGAAAGTTCCTTATGATGCCCTCTTTAG
TGAAGAACTCTTGATGAAGGATCCAAACTATCAACTTAAAGACGCTGATATTGTCAATGAAGTCAAGGGTGGTTA
TATCATCAAGGTCGATGGAAAAATATTATGTCTACTGCTGAAAGATGCAAGTCAAGTCAAGTCAAGTCAAGTCAAGT
65 GAAATCAATCGTCAAAAAACAAGACATGTCAAAGATAATGAGAAGGTTAACTCAATGTTGCTGTAGCAAGGTCT
CAGGGACGATATACGACAAATGATGTTATGTCTTAAATCCAGCTGATATTATCGAAGATACGGGTAATGCTTATA

TCGTTTCCTCATGGAGGTCACCTATCACTACATTCCCAAAAGCGATTATCTGCTAGTGAATTAGCAGCAGCTAAAGC
ACATCTGGCTGGAAAAAATATGCAACCGAGTCAGTTAAGCTATTCTTCAACAGCTAGTGACAATAACACGCAATC
TGTAGCAAAAGGATCAACTAGCAAGCCAGCAAATAAATCTGAAAACTCCAGAGTCTTTTGAAGGAACTCTATGA
5 TTCACCTAGCGCCCAACGTTACAGTGAATCAGATGGCCTGGTCTTTGACCCTGCTAAGATTATCAGTCGTACACCA
AATGGAGTTGCGATTCCGCATGGCGACCATTACCACTTTATTCCTTACAGCAAGCTTTCTGCTTAGAAGAAAAAG
TTGCCAGAATGGTGCTATCAGTGGAACCTGGTTCTACAGTTTCTACAAATGCAAAACCTAATGAAGTAGTGTCTAG
TCTAGGCAGTCTTTCAAGCAATCCTTCTTCTTTAACGACAAGTAAGGAGCTCTCTTCAGCATCTGATGGTTATATT
TTAATCCAAAAGATATCGTTGAAGAAACGGCTACAGCTTATATTGTAAGACATGGTGATCATTTCATTACATTCC
10 AAAATCAAATCAAATTGGGCAACCGACTCTTCCAAACAATAGTCTAGCAACACCTTCTCCATCTCTTCCAATCAAT
CCAGGAACTTCACATGAGAAAATGAAGAAGATGGATACGGATTTGATGCTAATCGTATTATCGTGAAGATGAA
TCAGGTTTTGTCTAGTACGGAGACCACAATCATTATTTCTCAAGAAGGACTTGACAGAAGAGCAAATTAAG
GTGCGCAAAAACATTTAG

4139.1

ATGAAAAAAGAGCAATAGTGGCAGTCATTGTACTGCTTTTGATTGGGCTGGATCAGTTGGTCAAACTCTATATCG
TCCAGCAGATTCCACTGGGTGAAGTGCCTCTGGATCCCCAATTTCTGTTAGCTTGACCTACCTGCAAAATCGAGG
TGCAGCCTTTTCTATCTTACAAGATCAGCAGCTGTTATTCTGCTGCTATTACTCTGGTTGTCTGATAGGTGCCATTT
GGTATTTACATAAACACATGGAGGACTCATTCTGGATGGTCTTGGGTTTGACTCTAATAATCGCGGGTGGTCTTGG
AAACTTTATTGACAGGGTCAGTCAGGGCTTTGTTGTGGATATGTTCCACCTTGACTTTATCAACTTTGCAATTTTCA
20 ATGTGGCAGATAGCTATCTGACGGTTGGAGTGATTATTTATTGATTGCAATGCTAAAAGAGGAAATAAATGGAA
ATTAA

4139.5

ATGAATACAAATCTTGCAAGTTTTATCGTTGGACTGATCATCGATGAAAACGACCGTTTTACTTTGTGCAAAAGG
ATGGTCAAACCTATGCTCTTGCTAAGGAAGAAGGCCAACATACAGTAGGGGATACGGTCAAAGGTTTTGCATACA
CGGATATGAAGCAAAAACCTCCGCCTGACAACCTTAGAAGTGACTGCCACTCAGGACCAATTTGGTTGGGGACGTG
TCACAGAGGTTTCGTAAGGACTTGGGTGCTTTTGGATACAGGCCTTCTGACAAGGAAATCGTTGTGTCTGCGA
TATTTCCCTGAGCTCAAGGAACCTCTGGCCTAAGAAGGGCGACCAACTCTACATCCGTCTTGAAGTGGATAAGAA
AGACCGTATCTGGGGCCTCTTGGCTTATCAAGAAGACTTCCAACGTCTTGCTCGTCTGCCTACAACAACATGCAG
30 AACCAAAACCTGGCCAGCCATTGTTTACCGTCTCAAGCTGTCAAGAACTTTTGTTTACCTACCAGAAAATAATATGC
TTGGTTTTATTCTATCTAGCGAGCGTTACCGAGAGCCACGTTTGGGGCAAGTATTAGATGCGCGCTTATTGGTTT
CCGTGAAGTGGACCGCACTCTGAACCTCTCCCTCAAACCAACGCTCCTTTGAAATGTTGAAAAACGATGCTCAGATG
ATTTTGACTTATTTGAAAGCAATGGCGGTTTCATGACCTTAAATGACAAGTCATCTCCAGACGACATCAAGGCAA
CCTTTGGCATTCTAAAGGTCAGTTCAAGAAAGCTTTAGGTGGTCTTATGAAGGCTGGTAAAATCAAGCAGGACCA
35 GTTTGGGACAGAGTTGATTAG

4139.8

ATGAAAGATGTTAGTCTATTTTTATTGAAAAAGTTTTCAAAAGCCGCTTAAACTGGATTGTCTTAGCTTTATTTGT
ATCTGTACTCGGTGTTACCTTTTATTTAAATAGTCAGACTGCAAACTCACACAGCTTGGAGAGCAGGTTGGAAAGT
CGCATTCAGCCAACGAGAGGGCTATCAATGAAAATGAAGAGAACTCTCCCAATGTCTGATACCAGCTCGGAG
GAATACCAGTTTGCTAAAAATAATTTAGACGTGCAAAAAAATCTTTGACGCGAAAGACAGAAATCTGACTTTAT
TAAAAGAAGGGCGCTGGAAAGAAGCCTACTATTGTCAGTGGCAAGATGAAGAGAAGAATTATGAATTTGTATCAA
ATGACCCGACTGCTAGCCCTGGCTTAAAAATGGGGTTGACCGCAACGGAAGATTTACCAAGCCCTGTATCCCT
TGAACATAAAAGCACATACTTTGGAGTTTCCGACCCACGGGATTGATCAGATTGTCTGGATTATAGAGGTTATCAT
45 CCAAGTTTGTGTTGTGTTGCTATTTTATGTCTAACACAACCTTTGCAAGAAAGATATCAAAATCATCTGGAC
ACAGTCACTTATATCCTGTTTCAAAAGTGACATTTGCAATATCCTCTCTTGGAGTTGGAGTGGGATATGTAAGT
TGCTGTTTATCGGAATCTGTGGCTTTTCTTTCTAGTGGGAAGTCTGATAAGTGGTTTGGACAGTTAGATTATCCC
TACCCAATTTATAGCTTAGTGAATCAAGAAGTAACTATTGGGAAAAACAAGATGTATTATTTCTGGCTTGCTCT
TAGCTTTCTTAGCCTTTATCGTCATTGTGGAAGTTGTACTTGAATTGCTTACTTTTCAAGCAAAAAATGCCTGTC
50 CTCTTTCTTTCACTCATTGGGATTGTTGGCTTATTGTTGGTATCCAAACCATTCAGCCTCTTCAAAGGATTGCACA
TCTGATTCCCTTTACTTACTTGCCTCAGTGGAGATTTATCTGGAAGATTACCTAAGCAGATTGATAATGTCGATC
TAAATTTGGAGCATGGGAATGGTCTTACTTCTGCTGATTATCTTTTGTCTATTGGGAATTCTATTTATTGAAAGA
TGGGGAAGTTCACAGAAAAAAGAATTTTTAATAGATTCTAG

4141.1

ATGATGAAGTTCATATTGGATATTGTTAGTACACCAGCTATTTAGTAGCTTAAATTGCAATCTTAGGATTAGTTCT
TCAGAAGAAGAAATTACCTGATATTATTAAGGTGGAATTAAGACCTTTGTTGGTTTCTTAGTTGTATCTGGTGGT
GCAGGAATTGTACAAAATCTTTAAATCCATTGGTACCATTGTTGAGCATGCTTTTCATTATCTGGCGTTGTGCC
GAATAATGAAGCAATTGTAGCTGTAGCTTTAAACAACATATGGCTCAGCTACTGCAATGATTATGTTTGCAGGCATG
60 GTGTTCAATATCTTAATCGCTCGTTTACTCGATTAAATATATTTTAAACAGGGCACCACACTCTATATATGGC
ATGTATGATTGCGGTCAATTTATCAGTTGCTGGCTTTACTAGCTTGCCTCTCATCTTACTAGGAGGATTAGCACTCG
GTATTATATGAGTATTTCCCCAGCAATTTGTGCAAAAAATATAGGTTCAATTAAGTGGAAATGACAAGGTAGCTTT
AGGTCAATTCAGTCTTTGGGATATTGGTTGAGTGGTTTACTGGTAGCCTTATCGGTGACAAATCAAAATCAACA
GAGGACATTAATTTCAAAGAGTTTAGCTTTTTTACGTGATAGTACTGTTAGTATTACTTTATCCATGGCAGTTAT
65 TTACATTATTGTAGCTATCTTGCAGGGTCAGAATATATAGAAAAAGAAATCAGTAGTGGTACAAGTGGTCTAGTT

5
TATGCTTTACAATTAGCAGGTCAATTTGCAGCAGGGGTATTTGTTATTTTAGCAGGTGTTGCGCTTATTTTGGGCGA
AATTGTTCCAGCCTTTAAAGGTATTTTCAGAGCGTCTTGTACCTAATTCAAAACCTGCTTTGGATTGTCCGATTGTTT
ATACTTATGCACCCAATGCAGTTCTAATTGGATTATCTCTAGTTTTGTTGGTGGTTTAGTAAGTATGGTAATTATG
ATTGCTTCAGGAACGGTTGTTATCTTACCAGGTGTTGTGCCCTCATTTCTCTGTGGAGCGACTGCAGGTGTCATTGG
GAATGCATCTGGTGGTGTTCGTGGAGCCACTATTGGAGCATTTTACAAGGTATTTAATCAGTTTCTTCCAGTCT
TTTTAATGCCAGTTTTGGGAGGACTTGGTTTCCAAGGATCAACTTTCTCAGATGCAGATTTTGGTCTTACAGGAATT
ATTTTAGGAATGTTAAATCAATTTGGCTCACAAAGCAGGCATTGTGATTGGTCTTGTCTTATTCTAGCAGTTATGTT
TGGAGTATCCTTTATTAAAAAGCCATCTGCAACGGAGGAATAA

10
4142.3
ATGATTAACCAATTTCTCTCTGCCCTTTCGGTCATTCTCTTTTCTATCCCTATCATAACTTATTCTTTTTTCCCATCT
TCTAATCTTAACATTTGGCTATCTACCCAACCTATCTTGGCACAGATTTATGCCTTCCCCTTAGCTACTGCAACTAT
GGCTGCTATTTTAAAGTTTCTTATTTTCTTCTATCTTTTACAAGAAAAATAAACAAATACGGTTTTACTTGGCA
TTTTGCTCTTACTATCGCTCATATTACTATTATTCGGAACAGATAAAACCCTTTCTTCTGCATCAAATAAGACTAAA
15
ACCTTAAAATTAGTAACCTTGGAAACGTGCTAATCAAATAGAAGCACAAATATTGAGCGAATTTTAGCCATTTTG
ACGCCGATATGGCTATATTCCCTGAAGTACTACCAATATCAGAGGTGAGCAAGAAAAACAGAGAATCAAATAT
TGTTCGATCAAGTTGGACTTTCTATGGCCAACCTATGATATTTTCACTTCTCCACCTACCAATAGTGAATAGTCTCT
GTGACTGTGATTGTCAAGAAAAGTTATGGTTTCTATACAGAAGCTAAAACCTTTTATACAACACGGTTCGGGACAA
20
TTGTATTACATTCGAGAAAAACAAATATACCAGATATCATTGCCTTGCATACTGCGCCTCCTCTGCCAGGTTTAAAT
GGAAATCTGGAAGCAAGACTTAAACATCATTCTATAATCAATTGGCTTCAAAATATCCAAAGGCTATTATTGCAAGGT
GATTTTAAATGCAACTATGCGTCATGGAGCACTTGCAAAAAAAGCTCTCATAGGGACGCATTAAATGCACTGCCA
CCTTTTGAAAGAGGAACCTTGAATAGCCAAAGTCCAAAACCTTTTAAATGCAACAATAGATCATATTTTATTGCCTA
AAAACCACTACTATGTTAAAGATTTAGACATTGTAAGTTTTCAAAACCTCTGATCATAGATGTATTTTACAGAAAT
CACATTTTAA

25
4142.4
ATGAATCCAATCCAAAGATCTTGGGCTTATGTCAGCAGAAAGCGACTGAGAAGTTTTATTTTATTTCTGATTTTAT
TGGTCTTATTGGCCGGAATTTTCAGCCTGTTTGAAGTCTGATGAAGTCCAAACAAACAGTAGAAAGCAATCTTTATAA
30
ATCACTCAATACATCTTTTCTATTAAAGAAGATAGAGAATGGTCAGACATTCAAGTTGTCAGACCTAGCATCTGTA
AGCAAGATTAAGGGGCTGGAAAAATGCTCTCCTGAACTTGAGACGGTTCGCAAACTAAAAGACAAGGAAGCAGTG
ACTGGCGAGCAGAGCGTGGAGCGTGATGATTTATCAGCTGCAGACAATAACTTGGTTAGCTTAACGGCTCTTGAG
GATTCATCCAAGGATGTAACCTTTACCAGTTCCGCTTTCAATCTAAAAGAAGGGCGACACCTTCAAAAAGGGGAT
TCCAAGAAAAATCCTTATCCACGAAGAATTGGCTAAGAAGAACGGTCTTTCGCTTATGACAAGATTGGCTTGGATG
35
CTGGTCAGTCTGAATCTGGAAGGACAAAACAGTAGAGTTTGAAGATTATCGGCATCTTTCTGGTAAAAACAAAG
AGAAATTCACAGGCTTGTCTTCTGACTTCAGTGAAAAATCAAGTCTTTACAGACTATGAAAGTAGCCAAACCTTTT
GGGCAATAGTGAAGCTCAAGTCAGTGCAGCAGCTTCTATGTAGAAAATCCTAAGGAAATGGACGGACTCATGAA
GCAGGTAGAAAACTTGGCCTTGGAAGAAATCAAGGCTACCAAGTTCGAAAAGGAAAAACAGGCTTTTGAACAAATCAA
40
AGACTCAGTTGCAACTTTCCAAACCTTCTGACCATCTTCTTTATGGGATGTTGATAGCAGGAGCTGGAGCCTTA
ATTCTGGTTTTGTCTCTCTGGTTGAGAGAACGGGTCTATGAAGTGGGGATTTTACTTGCATTGGAAGGCAAGA
GCTCGATCTTCTACAAATCTGTTTGAAGGTAGTTTTGGTATCTCTGGAGCTTTGCTTCCAGCATTTGTTCAGGA
AACGCAATCACACTTACCTACTCCAACTCTACTAGCAAGTGGAGATCAGGCAAGCTTACAAGATACACTAGCC
AAAGCAAGCAGTTTATCAACTAGCATCTTATCTTTGCAAGATCCTATGTTTTTCTAGTTCTGTTAGTCTTATC
TGTAGCCCTTTGTTTCTATTCTTATTTAGAAAATCACCGAAAGAAATTTTATCATCTATTAGTTAA

45
4142.5
ATGTTACACAACGCATTTGCTATGTTACAAGGAAGTTTTTCAAATCGATTGTCATCTTCTGATTATTCTCCTCAT
GGCGAGCTTGAGTTTGGTTCGGCTTGTAATCAAGGGAGCTACTGCCAAGGCTTCTCAGGAGACCTTTAAAAATATC
ACCAATAGCTTCTCCATGCAAAATCAATCGTCGCGTCAACCAAGGAACGCCTCGTGGTGTGGAATATCAAGGGT
50
GAAGACATCAAAAAAATCACCGAAAAACAAGGCCATTGAGTCTTATGTCAAACGTATCAACGCTATCGGAGATTG
ACTGGATATGACCTGATTGAAACGCCAGAAACCAAGAAGAAATCTCACTGCTGATCGTGCCAAGCGTTTTGGAAGT
AGCTTGATGATTACAGGTGTAATGACTCCTCTAAAGAAGACAAGTTGTCTCTGGTTCTTATAAACTAGTCAAG
GAGAGCACTTAACCAACGACGACAAGGATAAAATCCTCTTGCAACAAGGACTTGGCAGCCAAACACGGCTGGAA
GTAGGGGACAAAGGTTAACTGGACTCTAATATCTACGATGCAGATAATGAAAAAGGAGCCAAGGAAACAGTTGA
55
AGTGACAATCAAGGGACTCTTGATGGTCATAATAAGTCAGCAGTAACCTACTACAAGAACTTTACGAAAACAC
AGCTATTACAGACATTCACTGCTGCAAACTTTATGGATACACAGAAGACACAGCCATTTATGGGGACGCAAC
CTTCTTTGTAACAGCAGACAAGAACTTGGATGATGTTTGAAGAGTTGAATGGCATCAGTGGTATCAACTGGAA
GAGCTACACACTCGTCAAGAGCTCCTCTAACTACCCAGCTCTTGAGCAATCTATCTCTGGTATGTACAAGATGGCC
AACCTCCTCTTCTGGGGTAGCTTGAGCTTCTCAGTTCTCCTCCTTGCCTCTTGTCTCAGCCTTTGGATCAACGCCCC
60
TCGCAAGGAAGTGGGAATTTCTCTCTATCGGCCTCAAGCAGGCAAGTATCTTGGGTCA
TTTCATCACGAATCTATCTTGATTGCTTCTCCTGCTTACTTCTGCTTACTTCTAGTCAATTACACTGCCCCGTG
CAATTGGAACACTGTCCTTGCCAATGTGACTTCAGGTGTTGCCAAACAGGCTAGTAAGGCGGCTCAAGCCTCTA
ACCTTGGTGGTGGTGCAGAAAGTAGATGGCTTAGCAAGACCTTGTGAGCCTAGACATTTCCATTACAGACATCAGA
CTTATCATCATTTTGTCTTGGCTTGGTTCTCGTTATGGCGCTTGCTTCAAGCAATCTCCTTAGAA
65
AACAAACAAAAGAGCTCTTGCTGGATGGTGAATAA

4144.1

ATGTCACAGGATAAACAAATGAAAGCTGTTTCTCCCCTTCTGCAGCGAGTTATCAATATCTCATCGATTGTCGGTG
GGGTTGGGAGTTTGATTTTCTGTATTTGGGCTTATCAGGCTGGGATTTTACAATCCAAGGAAACCCTCTCTGCCTTT
ATCCAGCAGGCAGGCATCTGGGGTCCACCTCTCTTTATCTTTTACAGATTTTACAGACTGTCGTCCCTATCATTCC
AGGGGCCTTGACCTCGGTGGCTGGGGTCTTTATCTACGGGCACATCATCGGGACTATCTACAACATATATCGGCATC
GTGATTGGCTGTGCCATTATCTTTATCTAGTGCCTATACGGAGCTGCCTTTGTCCAGTCTGTCTGCAGCAAGC
GCACCTACGACAAGTACATCGACTGGCTAGATAAGGGCAATCGTTTTGACCGCTTCTTTATTTTATGATGATTG
GCCATTAGCCCAGCTGACTTTCTCTGTATGCTGGCTGCCCTGACCAAGATGAGCTTCAAGCGCTACATGACCATC
ATCATTCTGACCAAAACCCTTTACCCTCGTGGTTTATACCTACGGTCTGACCTATATTATTGACTTTTCTGGCAAAT
GCTTTGA

4144.2

ATGAGAAATATGTGGGTTGTAATCAAGGAAACCTATCTTCGACATGTGCGAGTCATGGAGTTTCTTCTTTATGGTGA
TTTCGCCGTTCTCTTTTTAGGAATCTCTGTAGGAATTGGGCATCTCCAAGGTTCTTCTATGGCTAAAAATAATAAA
GTGGCAGTAGTGACAACAGTGCCATCTGTAGCAGAAGGACTGAAGAATGTAATGGTGTTAACTTCGACTATAAA
GACGAAGCAAGTGCCAAAGAAGCAATTAAGAAGAAAAATTAAGGTTATTTGACCATGATCAAGAAGATAGT
GTTCTAAAGGCAGTTTATCATGGCGAAACATCGCTTGAAAAATGGAATTAATTTGAGGTTACAGGTACACTCAATG
AACTGCAAAATCAGCTTAATCGTTCAACTGCTTCTTGTCTCAAGAGCAGGAAAAACGCTTAGCGCAGACAATTC
AATTCACAGAAAAGATTGATGAAGCCAAGGAAAAATTAAGTTTATTCAAACAATTGCAGCAGGTGCCTTAGGAT
TCTTTCTTTATATGATTCTGATTACCTATGCGGGTGTAAACAGCTCAGGAAGTTGCCAGTGAAAAAGGCACCAAAAT
TATGGAAGTCGTTTTTTCTAGCATAAGGGCAAGTCACTATTTCTATGCGCGGATGATGGCTCTGTTTCTAGTGATT
TAACGCATATTGGGATCTATGTTGTAGGTGGTCTGGCTGCCGTTTTGCTCTTTAAAGATTGTCATTCTGGCTCAG
TCTGGTATTTGGATCACTTGGGAGATGCTATCTCACTGAATACCTTGCTCTTTATTTGATCAGTCTTTTCATGTA
CGTAGTCTTGGCAGCCTTCTAGGATCTATGTTTTCTCGTCTGAGGACTCAGGGAAGCCTTGTGCGCTTTGATG
ATTTTGATTATGGGTGGTTTTTTGGAGTGACAGCTCTAGGTGCAGCTGGTGACAATCTCCTCTTGAAGATTGGTTC
TTATATTCCCTTATTTTCGACCTTCTTTATGCCGTTTCGAACGATTAATGACTATGCGGGGGGAGCAGAAGCATGG
ATTTCACTTGCTATTACAGTGATTTTTCGGTGGTAGCAACAGGATTTATCGGACGCATGTATGCTAGTCTCGTTCT
TCAAACGGATGATTTAGGGATTGGAAAAACCTTTAAACGTGCCTTATCTTATAAATAG

4144.3

ATGACAGAAACCATTAAATTGATGAAGGCTCATACTTCAGTGCGCAGGTTTAAAGAGCAAGAAATTCCTCAAGTA
GACTTAAATGAGATTTTGACAGCAGCCAGATGGCATCATCTTGAAGAATTTCCAATCCTACTCTGTGATTGTGG
TACGAAGTCAAGAGAAGAAAGATGCCTTGTATGAATGGTACCTCAAGAAGCCATTGCGCAGTCTGCTGTTTTCT
TCTCTTTGTGGAGATTTGAACCGAGCAGAAAAAGGGAGCCGACTTCATACCGACACCTTCCAACCCCAAGGTGT
GGAAGGTCTCTTGATTAGTTTCGGTCGATGCAGCTCTTGCTGGACAAAAACGCCTTGTGGCAGCTGAAAGCTTGGGC
TATGGTGGTGTGATTATCGGTTTGGTTCGATACAAGTCTGAAGAAGTGGCAGAGCTCTTAACTACCTGACTACA
CCTATTCTGTCTTTGGGATGGCACTGGGTGTGCCAAATCAACATCATGATATGAAACCGAGACTGCCACTAGAGA
ATGTTGTCTTTGAGGAAGAATACCAAGAACAGTCAACTGAGGCAATCCAAGCTTATGACCGTGTTCAGGCTGACT
ATGCTGGGGCGCGTGGACCAACAAGCTGGAGTCAGCGCTAGCAGAACAGTTTGGTCAAGCTGAACCAAGCTCAA
CTAGAAAAATCTTGAACAGAAGAAATTATTGTAG

4146.1

ATGTTAAAACTTATTGCTATTGTTGGAACAAATTCAAAACGTTCTACAAACCGTCAATTGCTTCAATACATGCAAA
AACACTTTACTGACAAAGCTGAAATTGAACTTGTGAAATCAAGGCCATTCTGTCTTCAACAAACCAGCTGACAA
GCAAGTACCTGCTGAAATATTGGAATTTGCTGCTAAAAATCGAAGAGGCAGATGGCGTTATTATCGGTACTCCTGA
GTATGATCACTCTATTCCAGCTGTTTTGATGAGCGCTCTTGCTTGGTTGTCTTATGGTATTTACCCACTTTTGAACA
AACCAATCATGATTACAGGTGCTTCTACGGTACGCTTGGTTCATCTCGTGCCCAATTGCAACTTCGTCAAATCTT
GAATGCTCCTGAAATCAAGGCAATGTTCTTCCAGATGAATTTCTGCTCTCACACTCTCTTCAAGCATTTAACCCA
AGTGGCGACTTGGTTGACCTTGATGTTATCAAGAAATTGGATGCCATCTTTGATGACTTCCGTATCTTTGTAAAAA
TCACAGAAAAATTACGTAATGCACAAGAATTACTTCGCAAGATGCTGAAGACTTTGACTGGGAAAAATTTGTAA

4146.2

ATGAATACCTATCAATTAATAATGGAGTAGAAATTCAGTATTGGGATTTGGAACTTTTAAGGCTAAGGATGGA
GAAGAAGCCTATCGTGCAGTGTTAGAAGCCTGAAGGCTGTTATCGTCATATTGATACGGCGGCGATTATCAGA
ATGAAGAAAAGTGTGGTCAAGCAATCAAGATAGCGGAGTTCCACGTGAAGAAATGTTCTGTAACCTACCAAGCTTT
GGAATAGTCAGCAAACTATGAGCAAACTCGTCAAGCTTTGGAAAAATCTATAGAAAACTGGGCTTGGATTATT
TGGATTTGTATTGATTCAATTGGCCGAACCCAAAACCGCTCAGAGAAAAATGACGCATGGAAAACTCGCAATGCGG
AAGTTTGGAGAGCGATGGAAGACCTCTATCAAGAAGGGAAAAATCCGTGCTATCGGCGTTAGCAATTTCTTCCCC
ATCATTTGGATGCCTTGCTTGAACCTGCAACTATCGTTCTGCGGTCAATCAAGTTCGCTTGGCGCCAGGTGTGTA
TCAAGATCAAGTCGTAGCTTACTGCTGTAAGGGAATTTTATTGGAAGCTTGGGGCCCTTTTGGACAAAGGAGA
ACTGTTTGATAGCAAGCAAGTCCAAGAAATAGCAGCAATCACGGAAAAATCGGTTGCTCAGATAGCCTTGGCCTG
GAGCTTGGCAGAAGGATTTTACCACCTTCAAAAATCTGTCAACCTCTCGTATTCAAGCTAATCTTGATTGCTTT
GGAATTGAACTGAGTCATGAGGAGAGAGAAACCTTAAAAACGATTGCTGTTCAATCGGGTGTCCACGAGTTGAT
GATGTGGATTCTAG

4147.1

ATGAGGTGCAAAATGCTTGATCCAATTGCTATTCAACTAGGACCCCTAGCCATTCTGTTGGTATGCCTTATGTATTG
TGACAGGCTTGATTCTTGGCGTTTATTGACCATGAAAGAAGCACCTAGAAAGAAGATCATACCAGACGATATTTT
AGATTTTATCTTAGTAGCCTTTCCCTTGGCTATTTTAGGAGCTCGTCTCTACTATGTTATTTCCGATTTGATTACTA
TAGTCAGAATTTAGGAGAGATTTTGGCCATTGGAATGGTGGTTTGGCCATTACGGTGGTTTGATAACTGGGGCT
CTTGCTCTATATCTTTGCTGACCGTAAACTCATCAATCTTGGGATTTCTAGATATTGCGGCGCCTAGCGTTAT
GATTGCTCAAAAGTTTGGGGCGTTGGGGTAATTTCTTTAACCAAGAAGCTTATGGTGCAACAGTGGATAATCTGGAT
TATCTACCTGGCTTTATCCGTGACCAGATGTATATTGAGGGGAGCTACCGTCAACCGACTTTCCCTTATGAGTCTC
TATGGAATCTGCTTGGCTTTGCCTTGATTCTGATTTTATGACGGAAATGGAAGAGTCTCAGACGAGGTCAATAC
GGCCTTTTACTTGATTGGTATGGTTTCGGTCGTATGTTATCGAAGGTATGCGAACAGATAGTCTCATGTTCTTCG
GCTTTTCGAGTGTCCCAATGGCTGTCTGCTTATCGGTCTCGGTATAATGATCGTTATTTATCAAAATCGAAA
GAAGGCCCTTACTATATTACAGAGGAGGAAAACTAA

4147.2

ATGGGTAATTTATCCTCAATCCTTTTAGGAACCGTTTCAGGTGCAGCTCTTGCCTTGTTTTAAACAAGTGATAAGG
GCAAACAAGTTTGAGTCAGGCTCAAGATTTTCTAGATGATTGAGAGAAGATCCGGAGTATGCCAAGGAGCAAG
TCTGTGAAAACTGACAGAAGTTAAGGAGCAGGCTACAGATTTTGTCTGAAAAACAAAAGAACAGGTTGAGTCAG
GTGAAATCACTGTGGACAGTATACTTGCTCAAACTAAATCCTATGCTTTTCAAGCGACAGAAGCATCAAAAAATC
AATTAATAATCTCAAGGAGCAATGGCAAGAAAAAGCCGAAGCTCTTGATGACTCAGAAGAGATTGTGATTGATA
TAACAGAAGATAA

4147.3

ATGAAAACTAAATTGATCTTTTGGGGCTCTATGCTCTTCTCCTCTCCCTCTCCATCCTTCTGACCATTTATCTGGC
TTGGATTTCTATCCTATGGAGATTCAGTGGCTAAACTTAACGAATCGAGTCTATCTAAAACAGAAAACCATTCAA
TACAAATTTTCATATCTTGATGAATTATCTGACCAATCCTTTTAGTCAGGTCTTACAGATGCCTGATTTTCGTTCTG
AGCAGCTGGTCTGCACCATTTTCGCAGTGGTCAAGAATCTCTTCATTTGGTTCAAGTCTAGTAGCTCTAGTGACACTG
CCAAGTTTCTATGCTTTGTCAATAGGATTGTGAAAAAGGACTTTTGTCTCTTTATCGAAAAAGTCTCCTGGCTCT
AGTAGCTTACCTGTGATGATTGGACTTGGGGGAGTTTGTGTTGGTTTGGACCAATTTCTACTCTTTTCCATCAAA
TTCTCTTTGTGGGAGATGATACCTGGCTTTTGTATCCAGCCAAGGATCCTGTTATTATGATTTTGGCAGAGACCTTC
TTTCTTCATGCCTTCTCCTCTTTTGGCCCTCTATGAAAACTTCTTTGGCTATCTGTATCTGAAAAAGTCGTAGGAA
GTGA

4149.1

ATGACTTATCATTTTACTGAAGAATACGATATTATTGTAATTGGTGCGGGACACGCTGGGGTTGAGGCTTCTTGG
CCGCTAGCCGTATGGGCTGTAAGGTCTGCTTGGCACCATCAATATTGAAATGCTGGCTTTTCATGCCTTGTAAATCC
CTCTATCGGTGGTTCTGCCAAGGGGATTGTCGTGCGTGAAGTCGATGCCCTCGGTGGCGAGATGGCCAAAACCAT
GACAAGACTTACATCCAGATGAAGATGCTAAACACAGGGAAGGGGCCAGCTGTCCGTGCCCTTCGTGCGCAGGCT
GACAAGGAACCTTACTCTAAGGAGATGCGCAAGACGGTTGAAAAACCAAGAAAATCTGACCCTTCGTCAAACCATG
ATTGATGAGATTTTGGTGGAAGATGGCAAGGTTGTCGGTGTGCGTACAGCCACCCATCAAGAATATGCTGCTAAG
GCTGTTATTGTGACGACAGGGACTGCTCTCCGTGGGGAAATTATCATCGGAGACCTCAAGTACTCATCAGGTCTTA
ACCACAGCTTGGCTTCTATTAACCTAGCTGACAATCTCAAGGAACCTGGGTCTCGAAATCGGTGCTTTCAAGACAGG
AACCCTCCACGTGTCAAGGCTTCTCTATCAATTACGATGTGACAGAAAATTCAGCCAGGAGACGAAGTGCCTAAT
CATTTCTACACACTTCACGTGATGAGGATTATGTCAAGGACCAAGTACCATGCTGGTTGACCTATACCAATGGTA
CCAGTCAATGAGATTATCCAAAACAACCTCCACCGTGCCTATGTTTACAGGTGTGGTCAAGGGAGTGGGGCCTC
GTTACTGTCCGTGATTTGAAGACAAGATTGTGCGCTTTGCGGACAAGGAACGTCACCAACTCTTCTTGGACCCAGA
AGGGCGCAATACTGAGGAAGTCTATGTGCAAGGACTTCAACCAGTCTGCCGTGAGGATGTCCACGCTGACTTGGT
GCATTCCATCAAAGGTTTGGAAAAATGCAGAGATGATGCGGACAGGTTATGCTATTGA
GTATGATATGGTCTTGCCTCATCAGTTGCGTGCGACTTTGGAAACCAAGAAAATCTCAGGTCTCTTCACTGCTGGT
CAGACAAATGGAACATCAGGTTACGAAGAGGCAGCAGGCCAAGGGATTATCGCGGTATCAATGCGGCTCTGAA
AATCCAAGGCAAGCCTGAATTGATTTGAAGCGCAGTGATGGTTATATCGGGGTGATGATCGACGACTTGGTGAC
CAAGGGAACCATTTGAACCCTACCGTCTCTTGACCAAGTCTGCTGAATACCGTCTCATTCTTCGTATGACAATGCT
GATATGCGCTTGAAGTATGAGATGGGACGCGAGATTGGCTTGTGGACGATGAACGCTGGGCTCGTTTGAATCAAG
AAAAATCAATTTGATAATGAGATGAAGCGCCTAGACAGTATCAAACTCAAGCCAGTCAAGGAAAACCAATGCCAAG
GTTGAGGAGATGGGCTTCAAACCTTGAACGATGCAGTGACAGCCAAGGAATTCCTTCGCCGTCCAGAAGTTTCTT
ACCAAGATGTTGGTGGCCTTCATCGGACCAGCTGCAGAAGACTTGGATGACAAGATTATCGAATTGATTGAAACAG
AAATCAAGTATGAAGGCTATATTTCAAAGCCATGGACAGGTTGCCAAGATGAAACGCTGGAAGAAAAACGCA
TTCCGGCCAATATCGACTGGGATGACATTGATTTCTATCGCAACCGAAGCCCGTCAGAAAGTTCAAACTCATCAATCC
AGAAACCATCGGCCAAGCCAGCCGATTTTCGGGAGTAAACCCAGCAGATATTTCTATTTTGTGTTGATCTGGAA
GGTAAAAATCGTAGTATTTCTAAAACTCTTCAAAAATCAAAATGA

4149.2

ATGAAAGTATTAGCTTTTGATACGTCCAGCAAGGCTCTTCTCTGGCTATTTTAGAGGATAAGCAGGTTCTTGCCG
AGACGACGATTAATATTAAGAAAAATCAGATTAATCTTATGCCGTGCCATCGATTTTGTGATGGCAAGTTTGGG

TTGGACACCCAAGGATTTGGACCGAATCGTGGTAGCTGAAGGGCCGGGTAGCTATACAGGCTTGCGAATTGCGGT
AGCAACTGCTAAGACCTTAGCTCACACCTGAACATCGAGTTGGTTGGTATGTGAGTCTCTTGGCTCTGGTGCCC
CATCAACAAGAAGGTTTGTGTGCCCTTGATGGATGCGCGTCGCAATAATGTTTATGCAGGATTTTATGAAAATG
5 CCAAACCTGTCATGGCAGAAGCGCACCTATCTTTGAAGAGGTGCTAGAAAAAGTCAAGGGTACTAGTCAGGTAA
CCTTTGTGCGAGAAGTTGGCCCCTTTGTTGAGCAGATTCAAAAAACACTTGCCAAGGACTGATTACAAAGAAACATT
GCCCAATGCAGCTAATCTAGCTCTTTTGGCCTGGGACAAGGAAGCAGACTCCTTGATGATTTTGTGCCGAATTAC
CTCAACGAGTCGAGGCTGAGGAAAACTGGCTCAAGAACCATAACCGAGTCTGGCGAGTCTTACATTAACGCCTA
TGA

4149.3
ATGATAGAAATCAAGCGAATTCACAACAGCCTGACCTAGCTCAAGCCATCTACGCTGTTATGGCAGCTGTTTACC
TAGTCAGTCCTTGGACTCTGGAGCAAAATCCAAGCAGATCTGTCCCAAGACCAGACTTGGTATGCATTGGCTTATGA
TGGGGCAGAAAGTGGATTCTAGCTGTGCGAGGAGAATCTTTTGAAGCAGAAGTCCTGCAAAATCGCTGTCAA
15 AGGAGCTTATCAGGGTCAAGGGATTGCGTCagCCTTGTGTTGCTCAATTGCCGACAGACAAGGAAATTTCTCGAA
GTCAGACAGTCAAAATCAACGAGCGCAAGCATTTTACAAGAAAAGAAAGATGACAGTTATCGCTGAGCGAAAAGGC
CTACTACCATGACCCAGTCGAGGACGCCATTATCATGAAGAGAGAAATAGATGAAGGATAG

4152.2
ATGACAAAAACAAGTCTTATTAGTGGATGATGAAGAACACATTCTGAAATTGCTTGACTACCATTAAAGTAAGGAA
20 TTTAGAGGGTAAATATTATCCAAATCATGAGGCGATGATTTTATCACCGTTATAAAGAAGATATAGCACTTTTT
TGCTTGATATCATGTTACCACAATTAGATGGCATGGAAGTTTGAAGCGGCTGAGAGCCAAAGGCGTCAAAACTC
CAATTATGATGGTTTCTGCGAAAAGTGATGAATTTGATAAGGTTTGGCCTTGGAATTAGGGGCTGATGACTACCT
GACCAAGCCTTTTAGCCCTAGAGAATTGCTGGCGCGTGTCAAGGCTGTCTCAGGCGAACTAAAGGAGAAACAAGA
AGGAGATGATTTCAGATAAATATCGCTGACGATTCTTGCTATTTGGGACCTTGAAAGTATACCCTGAGCGTCATGAA
25 GTCTACAAGGCGAATAAGTTACTGAGTTTGACCCCAAAAGAATTTGAAAGCGATAAAAAATCCGTTTTTGAAGTTT
TCAAAGTTTCGAAAGTAACCGCCCAATAA

4154.1
ATGACTACTTTTAAAGATGGATTTTATGCGGTGGTGTCTGTTGCTGCTCATCAACTTGAAGGTGGATGGCAAGAAG
30 GTGGCAAGGGAATTAGTGTGCTGATGTTATGACTGTGGTCTGTCATGGAGTAGCTCGTGAAATTACTTTGGGAGT
TTTAGAGGGTAAATATTATCCAAATCATGAGGCGATGATTTTATCACCGTTATAAAGAAGATATAGCACTTTTT
GCTGAAATGGGATTCAAGTGCTTCCGTACCTCTATTGCATGGACACGTATCTTCCAAAAGGTGATGAGTTAGAGC
CGAATGAAGAAGGATTACAGTTTTATGATAATCTTTTGTGAATGCTTAAAGAATGGTATTGAACCTGTCATCAC
TCTATCTCATTTTGAATGCCTTATCACTTAGTGACCGAATATGGTGGTTGGAAAAATAGGAAATTGATTGATTC
35 TTTGCTCGTTTTGCAGAAAGTCGTAITTAACGTTACAAAGATAAGGTTAAATATTGGATGACTTCAATGAAATCA
ATAATCAAGCGAATTATCAGGAAGATTTTGACCACTTACTAACTCAGGTATTGTATATGAGGAAGGTGATAATAG
AGAAGCAATTATGTATCAAGCAGCACATTACGAATTAGTTGCTTCTGCACGAGCTGTAAAAATGGTCTAGAGATT
AATCCAGATTTTCAAATAGGTTGTATGATTGCGATGTGTCCAATTTATCCAGTTACTTGCAATCCTAAGGATATCTT
AATGGCAATGAAAGCTATGCAGAAGCGTTATTATTTGCTGATGTGCATGTTTTAGGTAAATATCCTGAGCATATT
40 TTCAAGTATTGGGAACGAAAAGGTATTTCAAGTTGATTTTACTGCCAGGATAAAGAAGATTACTTGGTGGGACTG
TAGATTACATTGGTTTCAGTTACTATATGTCCTTTGCTATCGACTCTCATCGTGAAAAATAATCCTTATTTTGATTAT
CTTGAAAACAGAAGATTTAGTGAAAAATAATTATGTTTGAAGGTTCTGAAATGGGAGTGGCAAAATTGATCCAGAAGGT
TTGCGTTATGCGTTAAATTTGGTTTACAGACCACTATCACTTACCCTCTTTATTGTTGAAATGGTTTTGGAGCTAT
AGATCAAGTTGCAGCAGATGGTATGGTACATGATGATTATAGAATTGAATATCTAGGTGCCCATATTCGTGAAATG
45 AAAAAGGCTGAGTTGAAGATGGTGTGATTTAATGGGTTATACTCCATGGGGATGTATTGATTTGGTTTCAGCTG
GTACCGGTGAAATGCGGAAACGTTATGGCTTTATTTATGTAGATAAAGATGATAATGGGAAGGGAAGTTATAATC
GTTCCCCGAAAAAATCTTTGGCTGGTATAAGGAAGTTATTTTCATCTAACGGTGAATCAGTAGAATAG

4154.2
ATGGATCAACAAAAACGGGTTGTTTGGTTTTCTTGAAAACCATGTTATGGGACCAATGGGCAAACTTGCTCAGTTTA
AAGTAGTACGTGCTATCACGCTGCAGGTATGGCTGCTGTACCAATTTACTATTGTAGGATCAATGTTTTGGTATT
CAGTATTATTGCCAAGCTTTCTCATTTTGGCCATTGTGGCAGATATTTCTCTGCTTCATTTGATAAATTCACAT
CACTTTACATGGTTTGCAAACTATGCGACTATGGGTTCTCTATCTCTTATTTCGTTCTATCACTGCAATGAAATTG
55 ACAAAAAATTTATGCAGAGGAAGAAGAACTCAATATGAATCCTCTTAAATGGTGCCTTGCTTGCTTGATGGCTTTTG
TCATGACAGTACCGCAATCATTTTTGATGGTGGATGATGAAGACTGTGACAAGTCTAAAAGAAGGTGCAGTAA
TTGCAGATGGATGGCAATGGGAAATGTAGTCGACGTTTGGGACAACAGGGATTTTACCGCAATCATTATGG
CAATTGTGACTGTTCTTATTTATCGTATGTGTGTTAAACATAAATTGGGTTATTAATAATGCCTGAAGCTGTTCCAGAA
GGAGTTTCTCGTGGATTTACCGCTTTGGTTCCGGGATTTGTTGTTGCATTTGTTGTTATCTTTATCAACGGTCTTCTT
60 GTAGCAATGGGAACAGATATTTTAAAGTCATTGCAATTCATTTGGTTTTGTATCCAATCTGACTAATTCGTGGA
TTGGTTAATGATTATTTATCTATGACTCAACTATTTGGATTGTAGGTATCCACGGTGCAGAACATGTTTTTGCA
TTTGTAGTCCAATTGCTCTTGCTAACATGGCTGAAAATGCTGCTGGCGGGCACTTCGCTGTTGCAGGTGAATTTT
CTAATATGTTTGTAAATTCAGGTGGTCTGGTGCACTTTAGGACTATGTTTATATATGCTTTTGCTCTAAATCT
GAACAGCTTAAAGCAATAGGACGAGCATCTGATGTTCCAGCCTTATTTAATATTAATGAACCAATTAATTTTGGAT
TACCTATTATCTATAATCCAGCCTTGGCTATACCAATTTATTTAGCACCAATGGTTACTGCTACTATTTATTACGTA
65 GCGAATTCTCTAACTTTATTAAGCCAATTATCGCACAGGTTCCATGGCCAACCTCAGTAGGGATTGGAGCTTTCT

TAGGGACAGCAGATCTTCGAGCTGTATTAGTTGCTCTAGTATGTGCATTTGCAGCATTCCTAGTCTATCTTCCATTC
ATCCGTGTATATGATCAAAAAATTGGTGAAAGAAGAGCAAGGTATCTAA

4155.1

5 ATGAAAAAATTTTATGTAAGTCCAATTTTTCTATTCTAGTAGGATTGATTGCGTTTGGAGTCTTATCCACTTTTCAT
TATTTTTGTAAATAAATCTGTTGACGGTTTTAATTTGTTTTCTTTTGTAGGAGGCTATGTTTTTTTATTTAAGAA
ACTGAGAGTGCATTATACAAGGAGTGATGTAGAACAGATACAGTATGTAAACCAAGCGGAAGAAAGTTTGAC
AGCTCTATTGGAACAGATGCCGTGAGGTGTTATGAAATTGAATTTATCTTCTGGAGAGGTTGAGTGGTTAATCCC
10 TATGCTGAATTGATTTTGACCAAGGAAGATGGTGATTTTGATTTAGAAGCTGTTCAAACGATTATCAAGGCTTCAG
TAGGAAATCCGTCTACTTATGCCAAGCTTGGTGAGAAGCGTTATGCTGTTTATGATGGATGCTTCTCCGGTGTTTT
GTATTTGTAGATGTATCCAGGGAACAAGCCATAACAGATGAATTGGTAACAAGTAGACCAGTGATTGGGATTGT
CTCTGTGGATAATTATGATGATTTGGAGGATGAACTTCTGAGTCAGATATTAGTCAAATCAATAGTTTGTAGCT
AATTTTATATCAGAGTTTTTCAGAAAAACACATGATTTTTCTCGTCCGGTAAGTATGGATCGATTTTATCTATTTAC
15 TGACTACACGGTGCTTGAGGGCTTGATGAATGATAAATTTCTGTTATTGATGCTTTCAGAGAAGAGTCGAAACAG
AGACAGTTGCCCTTGACCTTAAGTATGGGATTTCTTATGGCGATGGAAATCATGATGAGATAGGGAAGTTGCTT
TGCTCAATTTGAACTTGGCTGAAGTACGTGGTGGCGACCAAGTGGTTGTTAAGGAAAACGACGAAACGAAAAATC
CAGTTTATTTTGGTGGTGGGTCTGCTGCTTCAATCAAGCGTACACGGACTCGTACGCGCGCTATGATGACAGCTAT
TTCAGATAAGATTCCGAGTGTAGATCAGGTTTTTGTAGTCGGTCACAAAAATTTAGACATGGATGCTTTGGGCTCT
20 GCTGTAGGTATGCAGTTGTTCCGACGAATGTGATTGAAAAATAGCTATGCTCTTTATGATGAAGAACAATGTCTC
CAGATATTGAACGAGCTGTTTCATTATGAAAAAAGAAAGGAGTTACGAAGTTGTTGTCTGTTAAGGATGCAATGG
GGATGGTGACCAATCGTTCTTTGTTGATTCTGTAGACCATTCAAAGACAGCCTTAACATTATCAAAAGAAATTTTA
TGATTTATTTACCCAAACCATTTGTTATTGACCACCATAGAAGGGATCAGGATTTTCAGATAATGCGGTTATTACT
25 TATATCGAAAGTGGTCAAGTGTGCAAGCAAGTGTCTTGATGGCTGGTATGATGTTGGATACTAAAAATTTACCTCGCGAGTAA
CGTTTGATCGTATGCAAGCAAGTGTCTTGATGGCTGGTATGATGTTGGATACTAAAAATTTACCTCGCGAGTAA
CTAGTCGGACATTTGATGTTGCTAGCTATCTCAGAACGCGCGGAAGTGATAGTATTGCTATCCAGGAAATCGCTGC
GCAGATTTTGAAGAATATCGTGAGGTCAATGAACCTTATTTACAGGGGCGTAAATAGGTTTCAGATGTACTAATA
30 GCAGAGGCTAAGGACATGAAATGCTATGATACAGTTGTTATTAGTAAGGCAGCAGATGCCATGTTAGCCATGTCA
GGTATTGAAGCGAGTTTGTCTTGCAGAAGAATACACAAGGATTTATCTCTATCTCAGCTCGAAGTCGTAGTAAAC
TGAATGTACAACCGATTATGGAAGAGTTAGGCGGTGGAGGCCACTTTAATTTGGCAGCAGCTCAAATTAAGATG
TAACCTTGTGAGAAGCAGGTGAAAACTGACAGAAATTGTATTAATGAAATGAAGGAAAAGGAGAAAGAAGAA
TGA

4156.1

35 ATGAAAGAGAAAAATATGTGGAAAGAATTGTTGAATCGTGCAGGCTGGATTTTGGTCTTTTTACTTGCCGTCCTTT
TATATCAGGTTCCCCTAGTGGTTACCTCTATTTTGACTTTAAAAGAAGTAGCCCTGCTACAGTCAGGGCTGATAGT
TGCTGGCCTTTCAATTGTGGTCTGAGCTCTATTTATATGGGAGCTCGTAAAACCAAGTTAGCTAGTTTAAATTTT
CTTTTTTATAGAGCTAAAGATTGGCACGTTTGGGCTTGAGTTATCTAGTTATTGTGCGGTCAAATATACTTGGTTCC
40 ATTTTATTGCAACTGTCAAATGAGACGACAACAGCTACAGTCTCAGATTAATGATATGGTTCAAAATAGTTCGT
TGATTTCCAGTTTCTTCTGCTAGCCTTGCTTCTCCGATTTGTGAGGAAATCTTGTGTCGTGGGATTGTTCTTAA
AAGATTTTCCGAGGCAAGGAGAACTTGGGATTTGTAGTCGGTACGATTGTGTTGCTTTATTGCATCAACCAAGTA
ATTTACCTTCTTTATTGATTTATGGAGGTATGTCGACAGTTCTATCTTGGACAGCCTACAAGACCCAACTTTGGA
AATGTCGATCTTGCTTACATGATTGTTAATGGGATTGCTTTCTGTTTGTGGCTCTTGTGGTGATTATGAGTCGGA
45 CATTAGGAATTTCTGTTTAAATGAAAGAGAAAAATATGTGGAAAGAATTGTTGAATCGTGCAGGCTGGATTTGGT
CTTTTTACTTGCCGTCCTTTTATATCAGGTTCCCCTAGTGGTTACCTCTATTTTGAATTTAAAAGAAGTAGCCCTGC
TACAGTCAGGGCTGATAGTTGCTGGCTTTCAATTGTGGTTCTGGCTCTATTTATTATGGGAGCTCGTAAAAACCA
GTTAGCTAGTTTAAATTTTCTTTTTTATAGAGCTAAAGATTGGCACGTTTGGGCTTGAGTTATCTAGTTATTGTCG
GGTCAAATATACTTGGTTCCATTTTATTGCAACTGTCAAATGAGACGACAACAGCTAACCAAGTCTCAGATTAATGA
50 TATGGTTCAAAATAGTTGTTGATTTCAGTTTCTTCTGCTAGCCTTGCTTGGTCCGATTTGTGAGGAAATCTTGT
GTCGTGGGATTGTTCTAAAAAGATTTTCCGAGGCAAGGAGAACTTGGGATTTGTAGTCGGTACGATTGTGTTTGC
TTTATTGCATCAACCAAGTAATTACCTTCTTTATTGATTATGGAGGTATGTGACAGTTCTATCTTGGACAGCCT
ACAAGACCCAACGTTTGGAAATGTCGATCTTGTCTTACATGATTGTTAATGGGATTGCTTCTGTTTGTGGCTCTT
GTGGTGATTATGAGTCGGACATTAGGAATTTCTGTTTAA

4156.4

55 ATGGATACACAAAAGATTGAAGCGGCTGTAAAAATGATTATCGAGGCTGTAGGAGAGGACGCTAATCGCGAGGGC
TTGCAGGAAACACCTGCTCGTGTAGCCGTATGTATCAAGAGATTTTTCAGGTCTGGTCAAACAGCAGAGGAAC
ATTTGTCAAAATCCTTTGAAATTATTGACGATAATATGGTGGTAGAAAAGGATATCTTTTCCATACCATGTGTGA
ACACCACTTCTTGCCATTTTATGGTAGAGCGCACATTGCCTACATTCCAGATGGTCGTGTGGCAGGCTTGTCTAAG
60 CTAGCCCGTACGGTTGAAGTTTATTCGAAAAACCAAAATTCAAGAACGTTGAATATCGAAGTGGCCGATGCC
TTGATGGACTATCTAGGTGCTAAAGGAGCCTTTGTTGTCAATTGAGGCGGAACATATGTGTATGAGTATGCGTGGTG
TTAGAAAACCAAGGCACTGCAACCTTGACGACAGTAGCTCGTGGTCTATTTGAAACAGATAAGGATCTCCGTGACC
AAGCTTATCGTTAATGGGGCTATAA

4157.2

ATGAAAGACTTGTTTTTAAAGAGAAAGCAGGCCCTTTCGTAAGGAGTGTCTTGGTTATCTGCGCTATGTGCTCAATG
 ACCACTTTGTCTTGTTCCTGCTTGTCTGTTGGGCTTTCTAGCCTACCAGTACAGTCAACTCTTACAACATTTTCCT
 GAAAATCATTGGCCTATCCTTTTGTGTTAGGAATTACGTCTGTTTACTTTTACTTTGGGGAGGAACTGCCACCTA
 TATGGAGGCTCCAGACAAGCTCTTTCTCTTAGTTGGAGAAGAGGAAATTAAGCTCCATCTCAAGCGTCAAACTGG
 5 CATTTCCCTAGTCTTTTGGCTCTTTGTACAGACCCCTTTCTGCTGTTATTTGCGCCTTATTTTTAGCAATGGGTTA
 TGGCTTGGCAGTTTTCTGCTCTATGTGCTTTTATTGGGGGTAGGAAAAATTTCCACTTTTGTCAAAAAGGCCAGCA
 AATTTTTCACTGAAACTGGACTGGACTGGGACTATGTTATTTCTCAAGAAAGCAAGCGTAAGCAAGTCTTGCTTCG
 TTTCTTTGCCCTCTTTACGCAGGTCAAGGGAATTTCAAACAGCGTTAAGCGTCGTGCCTATCTGGACTTTATTTAA
 10 AGGCTGTTCAGAAGGTGCCTGGGAAGATTGGCAAAATCTCTATCTGCGTTCTTATCTGCGAAATGGCGACCTCTT
 TGCTCTCAGTCTTCGTCTTCTCTTGCTTTCTTGCTGGCGCAGGTTTTATCGAGCAAGCTTGGATTGCGACAGCAG
 TGGTAGTTCTCTTAACTACCTCTTGCTCTTCCAGTTGCTGGCCCTCTATCATGCCTTTGACTACCAGTATTGACC
 CAACTCTTTCCGCTGGACAAGGGGCAAAAGGAAAAAGGCTTACAGGAGGTAGTTCGAGGATTGACCAAGTTTGT
 TTACTTGTGGAATTAGTTGTTGGGTTGATTACCTTCCAAGAAAACTAGCCCTTCTAGCCTTACTAGGAGCTGGTT
 15 TGGTTTTACTAGTCTTGTATTGCTTATCAGGTAAAACGTCAGATGCAGGACTAA

4158.1

ATGAGAAAATCAATAGTATTAGCGGCAGATAATGCCTATCTTATTTCTTTAGAGACGACTATAAAGTCTGTATTGT
 ATCACAATAGAGATGTTGATTTTTATTTCTCAACAGTGATATAGCTCCTGAATGGTTTAAATTATTGGGGAGAAA
 AATGGAAGTTGTGAATTTCTACAATTCGACGTGTACACATTGATAAAGAAGCTTTTGAAGCTATAAAACAGGACCT
 20 CATATAAATTATGCTTCTTACTTTAGATTTTTTGGCAGAGAAGTGGTTGAATCTGATAGGATTGTTATCTGGATT
 CGATATCATTGTAAGTGGGAACTAGCTACTTTGTTTGAAGATAGATCTCAAAGGATATTCAATTGGTGCTGTTGAT
 GATGCTATGCCTATGAAGGACGAAAATCTGGATTTAATACCTGGTATGTTACTAATGGATGTTGCAAAAGTGAAAG
 AACATTCTATTGTCAATAGTTTATTGGAATTAGCGGCGGACGAGAATCAAGTTGTTTCATCTTGGGGATCAGAGTAT
 TTTAAATATTTATTTTGGAGTAATTGGCTAGCCTTACAGATAAACAATATAATTATATGGTGGGTATTGATTTTATC
 25 ACCTTGCTCAAGAATGTGAACGTCTAGATGACAATCCACCTACAATTGTTCACTATGCTAGTCAATGATAAACCTTG
 GAATACATATAGTATATCTAGACTACGTGAATTATGGTGGGTTTATAGAGATTGGATTGGTCAGAGATTGCTTTT
 CAACGTTCCGATTTAAATTATTTTGAAGAAGCAATCAGTCTAAAAAACAAGTGATGCTTTGACATGAGATGCA
 GATATAAAACATTTAGAGTATTTAGTACAACGGTTACCTGATTGGCATTTCATTGGCTGCACCGTGTGATTGTTG
 TGAGGAGCTGACCTCTCTATCACAGTATACGAATGTAACAGTATATCAAAATGTATTACATAGTAGAATTGATTGG
 30 CTATTGGACGATTCTATAGTTTATTTAGATATTAATACAGGTGGAGAGGTTTTAATGTAGTTACAAGGGCACAAG
 AAAGTGGCAAGAAAATCTCGCTTTTGATATCACAGTAAAAAGTATGGATGATGGACTCTATGACGGTATTTTTTC
 TGTGGAGAGACCAGATGATTTAGTGGATAGAATGAAGAATATAGAGATAGAGTAA

4158.2

ATGACTAAGATTTTATTCGTCAATAGCAGTAAAAAAGGACTATTTACCTCATTTCTACTGTTTATCTATGTATTGG
 GAAGTCGTATTATTTCCCTTTTGTGACCTAAATACTAAAGATTTTTTAGGAGGTTCAACAGCCTATCTAGCCTTC
 TCAGCCGCCCTAACAGGTGGGAATCTAAGAAGTTTATCAATTTTTCTGTTGGATTATCCCCTTGGATTGCTCCGCCA
 TGATTTTATGGCAGATGTTTTCTTTTTCTAAACGGTTGGGTTTAAACATCTACGCTATAGAAAATCAAGATCGCGGT
 40 AAAATGTACCTGACCTTGCTAATTGCTGTGATTCAATCCTTGGCAGTTAGCTTGAGACTGCCAGTACAATCCTCCT
 ATTCTGCAATATTGGTTGTTCTAATGAATACAATTTGCTATAGCAGGAACATTTTTCTTGTGTTGGTTGTGAGAT
 TTTAAATGCGAGTATGGGATGGAGGTTTATTGTAATCTCCTATCCAGTATGGTTTTAAATATTTCTCCTCAGATG
 TTTTGGAAACATTTCAAGACAGTACACATTCCAACAGGGATTATTGTGTTACTTGCTTTATTAACCCTTGTCTTTCT
 TATTTACTTGCCCTTATGTATCGAGCTCGCTATTGTTGTTCTGTTAATAAAATTGGCTTACACAATCGATTTAAACG
 45 CTATTTCTATCTCGAAATCATGTTGAATCCTGCAGGTGGGATGCCTTATATGTATGTGATGAGTTTCTTAGTGTAC
 CAGCTTATTTGTTTATCTTGTGTTGGGATTATTTCCCTAATCATTACAGGTTAGCGGCTTTATCAAAAGGAATTTATG
 GTTGGAAAAGCCTTTGTGGGTCTATGTTTATTTCCGTCTTATTTTATTTAGTATCATTTTGTCTTTGTTACGATG
 AATGGAGAAGAGATTGCAGACCGTATGAAAAAATCTGGAGAATACATTTATGGTATTTATCCAGGTGCGGATACT
 AGTCGATTTATTAATCGATTGGTCCTTCGTTTCTCAGTCATAGGTGGTCTCTTTAATGTGATTATGGCAGGTGGTCC
 50 CATGCTTTTTGTTTTGTTTATGAAAAAGTTATCAGTATGGCAATGATTCCAGGCTTATTTATGATGTTGGGGGCA
 TGATTTTTACGATTAGAGACGAGGTCAAGGCTTAAAGGCTAAATGAGACCTATAGACCTTTGATTAG

4158.3

ATGTCCTCTCTTTCCGGATCAAGAATTAGTAGCTAAAACAGTAGAGTTTCGTACGCTCTTTCCGAGGGAGAAAGTC
 TAGACGATATTTTGGTTGAAGCTTTTGTCTGTGGTGCGTGAAGCAGATAAGCGGATTTTAGGGATGTTTCCTTATGA
 55 TGTTCAAGTCATGGGAGCTATTGTCTGCACTATGGAATGTTGCTGAGATGAATACGGGGGAAGGTAAGACCTT
 GACAGCTACCATGCCTGTCTATTTGAACGCTTTTTCAGGAGAAGGAGTGATGGTTGTGACTCCTAATGAGTATTTA
 TCAAAGCGTGATGCCGAGGAAATGGGTCAAGTTTATCGTTTTCTAGGATTGACCATTGGTGTACCATTTACGGAAG
 ATCCAAAGAAGGAGATGAAAGCTGAAGAAAAAGAGCTTATCTATGCTTCGGATATCATCTACACAACCAATAGTA
 60 ATTTAGGTTTTGATTATCTAAATGATAACCTAGCCTCGAATGAAGAAGGTAAGTTTTTACGACCGTTTAACTATGT
 GATTATTGATGAAATTGATGATATCTTGCTTGATAGTGCACAACTCCTCTGATTATTGCGGGTCTCCTCGTGTTT
 AGTCTAATTACTATGCGATCATTGATACACTTGTAAACAACCTTGGTCAAGGAGAGGATTATATCTTTAAAGAGGA
 GAAAGAGGAGGTTTGGCTCACTACTAAGGGGGCCAAAGTCTGCTGAGAATTTCTAGGGATTGATAATTTATACAA
 GGAAGAGCATGCGTCTTTTGTCTCGCTATTGTTTATGCGATTGCGAGCTCATAAGCTCTTTACTAAAGATAAGGAC
 65 TATATCATTCTGGAATGAGATGGTACTGGTTGATAAGGGAACAGGGCGTCTAATGGAAATGACTAACTTCAA
 GGAGGTCTCCATCAGGCTATTGAAGCCAAGGAACATGTCAAATTATCTCTGAGACGCGGGCTATGGCCTCGATC

ACCTATCAGAGTCTTTTTAAGATGTTTAATAAGATATCTGGTATGACAGGGACAGGTAAGGTCGCGGAAAAAGAG
TTTATTGAACTTACAATATGTCTGTAGTACGCATTCCAACCAATCGTCCGAGACAACGGA
TTGACTATCCAGATAATCTATATATCACTTTACCTGAAAAAGTGTATGCATCCTTGGAGTACATCAAGCAATACCA
5 TGCTAAGGGAAATCCTTTACTCGTTTTTGTAGGCTCAGTTGAAATGTCTCAACTCTATTCGTCTCTTGTTCGTG
AAGGGATTGCCATAATGTCCTAAATGCTAATAATGCGGCGCGTGAGGCTCAGATTATCTCCGAGTCAGGTCAGA
TGGGGGCTGTGACAGTGGCTACCTCTATGGCAGGACGTGGTACGGATATCAAGCTTGGTAAAGGAGTCGCAGAGC
TTGGGGGCTTGATTGTTATTGGGACTGAGCGGATGAAAAGTCAGCGGATCGACCTACAAATTCGTGGCCGTTCTGG
TCGTCAGGGAGATCCTGGTATGAGTAAATTTTTTGTATCCTTAGAGGATGATGTTATCAAGAAATTTGGTCCATCT
10 TGGTGCATAAAAAGTACAAAGACTATCAGGTTCAAGATATGACTCAACCGGAAGTATTGAAAGGTCGTAATAAC
CGGAACTAGTCGAAAAGGCTCAGCATGCCAGTGATAGTGTGGACGTTTCAGCACGTCGTGAGTCTGGAGTAT
GCTGAAAGTATGAATATACAACGGGATATAGTCTATAAAGAGAGAAATCGTCTAATAGATGGTTCTCGTGACTTA
GAGGATGTTGTTGTGGATATCATTGAGAGATATACAGAAGAGGTAGCGGCTGATCACTATGCTAGTCGTGAATTAT
TGTTTCACTTTATTGTGACCAATATTAGTTTTCATGTTAAAGAGGTTCCAGATTATATAGATGTAAGTACAAAACT
15 GCAGTTCGTAGCTTTATGAAGCAGGTGATTGATAAAGAACTTTCTGAAAAGAAAAGAACTTAATCAACATGACT
TATATGAACAGTTTTTACGACTTTTCACTGCTTAAAGCCATTGATGACAACTGGGTAGAGCAGGTAGACTATCTACA
ACAGCTATCCATGGCTATCGGTGGTCAATCTGCTAGTCAGAAAAATCCAATCGTAGAGTACTCAAGAAGCCTA
CGCGGCTTTGAAGCTATGAAAGAACAGATTCTAGTCGGATATGGTGCCTAATCTCTGATGGGGCTGGTTGAGGT
CACTCCAAAAGGTGAAATCGTGACTATTTCCATAA

4158.4
ATGATAGGGACTTTTCGCGCTGCTCTTGTAGCTGTACTAGCAAATTTTCATCGTCCCTATTGAAATTACCCCAAATA
GTGCCAATACTGAAATTGCACCACAGATGGGATTGGGCAGGTTCTCAGCAACCTCTTGCTCAAACCTGGTTGACA
ACCCAGTCAACGCCCTGCTTACTGCTAATATATTAGAATCTTATCTTGGGCAGTCATTTTGGAAATCGGTATGAG
25 AGAAGCCAGTAAAAATAGTCAAGAATTGCTAAAAAACTATCGCTGACGTGACTTCTAAAAATTCGAATGGATCAT
CAATCTGGCTCCATTTGGAATCCTTGGTCTTGTTTTTAAACCATTCTGACAAGGGAGTCGGAAGCCTTGCCAAC
TACGGTATTTTATTGGTTCTATTAGTAACGACTATGCTTTTGTGTCCTGTGGTCAACCTTTGATTGCTTCTTC
TTTATGAGACGCAATCCTTACCCTCTAGTTTGGAACTGCCTCGGTGTCAGCGGTGTGACAGCCTTTTCACTCGTA
GTTCTGCGACTAACATTCTGTCAACATGAACTCTGCCATGACCTTGGACTCAACCCAGATACCTATTCTGTTTC
30 TATCCCACTCGGTTCTACTATCAATATGGCTGGAGTAGCGATTACCATTAACTTTTGACCCTTGCTGCAAGTAAAC
ACTCTTGAATTCCTGTTGACTTTGCCACAGCCTTTGCTCAGTGTGGTAGCAGCTATCTCATCTGTGATGCTTC
AGGTATTGCCGAGGTTCCCTCCTTCTTATCCCAGTTGCTGTAGCCTTTTCGGTATTCTAACGATTCGTCATAC
AAATTGTTGGGGTTGGTTTTGTGATTGGTGTATCCAAGACTCATGTGAAACAGCCCTTAACCTTCTACAGATGT
CCTCTTTACCGCGGTTGCCGAATACGCAGCAACCCGTAATAAATAA

4158.5
ATGTCTATTAGCCAACGTACGACCAAGCTCATCTTAGCTACCTGTCTTGCTGCCTGCTTGCTTATTTTCTCAATCT
TTCGTCAGCAGTTTCGGCTGGAATTATCGCTCTCTTGAGCCTATCTGATACGCGTAGAAGTACTTTAAAACTGGCT
CGCAATCGTCTTTTTTCTATGCTTCTAGCTCTGGCTATCGGTGTTCTAGCTTTTCACTTGAGCGGATTTCATATCTG
40 GAGTCTCGGCCTCTATCTGGCCTTCTACGTTCTTTAGCCTACAAGATGGGCTGGGAAATTGGCATCACACCAAGC
ACTGTTTTGGTTAGCCATCTCTTGGTTCAAGAGTCAACCTCTCCAGACCTTCTAGTCAATGAATTCCTTCTCTTTC
TATTGGTACAGGATTGCTTGTGTTAATCTCTATATGCCTTACGAGAAGAGGAAATCCAGCACTACCAACAG
CTGGTGGAAGAAAAAGTTAAAGATATCCTCCAGCGCTTCAAAATACTATTATCCAGAGGAGACGACGCAACCGA
GCACAGCTGGTAGCAGAATTAGACACGCTTTTGAAGAAGCCCTCAGACTGGTCTATTTGGATCACTCTGACCACC
TCTTTCACCAGACAGACTACCATATCCACTACTTTGAGATGAGACAGCGACAAAGTCGTATCCTGAGAAACATGG
45 CCCAACAGATTAACTGTACCTTGCCGCCAGTGAAGCCTGATCTTAGCGCAACTCTTTCAAAAAATTGCAGG
TCAACTGAGCCAGACCAATCCTGCTTCTGATTGCTAGATGAAATTGAACGTTATCTGGAAGTCTTCCGGAACCGC
AGTCTGCCCAAGACAAGAGAAGAATTGAAACCCGCGCCACCCTTCTTCAACTCCTACGTGAAGCAAAACCTTC
ATCCAAGTAAAGTTGATTTTTACAAAAATATAGACAGTAA

4158.6
ATGGAAATCATGTCGCTTGCGATTGCTGTTTTTGCCGTCATCATTGGTTTATGTCATTGGATATGTCAGCATCTCAGC
TAAGATGAAATCATCTCAGGAAGCTGCAGAGTTGATGCTTTTAAATGCTGAACAAGAAGCAACTAATTTACGTGG
ACAAGCTGAGCGTGAAGCGGATTTACTTGTAAATGAAGCCAAACGTGAAAGCAAGTCTCTTAAAAAAGAACACT
55 ATTGGAGGCCAAAGAAAGCCAGAAAATACCGTGAAGAAGTGGACGCTGAATTCAAATCAGAACGTCAAGAAC
TCAAAACAAATCGAAAGTCGTTTGACAGAGAGAGCTACTAGCCTTGACCGTAAGGACGACAATTTGACGAGTAAAG
AACAAACACTTGAACAAAAAAGAACAAAGTATTTCTGATAGAGCGAAAAACCTTGATGCGCGTGAAGAGCAATTAG
AGGAAGTCGAAAGACAAAAAGAACAGAACTAGAGCGTATTGGTGCCTGTCTCAGGCAGAACGACGAGATATT
ATCTTGGCTCAGACAGAGGAAAACTTGACCAGGGAGATTGCCAGTCGCATTGCGGAAGCTGAGCAAGAGGTCAAG
GAACGTTCTGACAAAAATGGCCAAGGACATCTTGGTTCAAGCTATGCAACGTATCGCTGGTGAATATGTAGCGGAG
60 TCAACAACTCAACAGTTCTATCTGCCAGCATATGCAAGGACGCATTATTGGTCGTGAAGGTCGTAAACATT
CGTACCTTTGAAAGTTTGACAGGGGTCGATGTGATTATCGACGATACACCAGAAGTGGTGACCTTGTGAGGATTG
ATCCGATTCTGTCGATGAGATTGCCCGTATGACTATGGAAATGTTGCTCAAAGATGGTCGTATACATCCAGCTCGTAT
CGAAGAGTTGGTTGAGAAAAACCGTCAAGAGATTGACAAATAAGATTTCGTGAATACGGTGAGGCTGCTGCTATGA
AATTGGTGCGCCAAACCTTCTATCCAGACTTGATGAAGATTATGGGACGTTTGCAAGTTCCTTCTATATGGACAA
65 AATGTTTTGCGCCATTGATTGAGGTTGCTAAGTTGGCTGGTATCATGGCGAGCGAACTGGTGAAAATGCGGCTC

TTGCCCGTCGTGCTGGATTCTTCACGATATCGGGAAAGCCATTGACCATGAGGTTGAAGGTAGCCACGTTGAAAT
CGGTATGGAATTGGCCCGTAAGTACAAGGAACCCCAAGTTGTTGGTGAATACGATTGCTAGTCACCACGGAGATGT
TGAAGCTGAGAGCGTGATAGCAGTTATCGTCGTCGACGAGATGCCTTGAGCGCAGCCCGTCCAGGTGCTCGTAG
TGAGTCTCTTGAAGCTACATCAAGCGTCTCCATGATTTGGAAGAAATTGCTAACGGCTTTGAAGGAGTGCAAAAT
5 AGCTTTGCCCTTCAAGCAGGACGTGAAATTCGTATCATGGTCAATCCAGGAAAAATCAAGGACGACAAAGTCACA
ATCTTGGCTCACAAAGTTCTGTAAGAAAAATTGAAAAAATCTCGATTATCCAGGAAATATCAAGGTAACCGTGATT
CGCGAGCTTCGTGCAGTAGATTATGCTAAATAA

4158.7

10 ATGATGTTAAAAACCTCTATTGATACCTTGCTCGACAAGGTTCTTCAAAATATTCACCTCGTAATCTTGAAGCAA
AACGTGCCCACGAATTGGAAGCAGGTGCCCCAGCAACTCAAGGTTTCAAGTCTGAAAAATCAACTCTTCGCGCTT
TAGAAGAAATCGAATCAGGAAACGTTACAATTCACCCAGATCCAGAAGGAAAAACGTGAAGCAGTGCGTCGCCGT
TCGAAGAGAAAAACGCCGCAAGAAGAAGAAAAAGAAAAATCAAAGAGCAAAATTGCTAAAGAAAAAGAAGA
15 TGGTGAATAATTTAA

4161.1

ATGTCAGCATATCAATTACCGACCGTATGGCAGGATGAAGCTAGTAATCAAGGAGCTTTTACGGGGCTAAACAGA
CCAACAGCAGGTGCCCCGTTTCGAACAAAACTTGCCAAAAGGAGAACAAGCTTTTCAGCTTTATTCAGTGGGAACA
CCAAATGGTGTGAAGGTTACTATCTTATTGGAAGAATTACTAGAAGCTGGTTTTAAGGAAGCGGCTTACGACTTGT
20 ATAAGATTGCTATCATGGATGGGGATCAATTCGGATCAGACTTTGTGAAGCTCAATCCAAATTCGAAGATTCCAGC
CTTATTGGACCAGTCAGGTACTGAAAACGTAAGAGTCTTTGAGTCTGCTCATATTCTTTACCTTGCTGAGAAA
TTTGGAGCCTTTTACCAAGTAATCCTGTGGAAGGTTAGAAAGTTTGAATTGGCTATTCTGGCAAGCAGGTGCAG
CACCTTTCTAGGTGGGGATTTGGACATTTCTCAATTATGCTCCTGAAAAATTGGAATATCCTATTAACCGTTTT
ACGATGGAAGTGAAACGCCAGTTGGATTTATTGGATAAGGAATTGGCTCAGAAAACTTATATTGCAGGCAATGAC
25 TATACGATTGCAGATATTGCTATCTGGTCTTGGTATGGACAGTTAGTTCAAGGAAATCTTTACCAAGGTTCTGCAA
AATCTTGGATGCCTCAAGTTATCAAAATCTAGTAAATGGGCAGAAAAAATTGCCAATCGTCCAGCTGTTAAGC
GTGGCTTGAAGTAACCTTATACAGAAATTAATAG

4161.2

30 TTGGCAAGCTTGATCACTTCTATCATCATGTTCTATGTCGGTTTTCGATGTTCTAAGAGATACCAATCAAAAGATTCT
CAGTCGGGAAGAAACGGTCATTGATCCTCTTGGTGCAACTCTAGGAATCATTCTGCAGCGATTATGTTTGTGGTC
TATCTCTACAATACTCGCCTCAGTAAGAAATCCAATCCAATGCGCTGAAGGCAGCTGCTAAGGACAATCTTCTG
ACGCTGTACCTCACTTGAACCGCCATTGCCATCCTAGCTAGTAGTTTCAATTATCCGATTGTGGATAAACTGGT
35 TGCTATCATCATCTTTTATCTTGAAGACTGCCATGTATATCTTCATCGAGTCTTCTTTAGTCTTTTCAGATG
GCTTTGACGACCGCTGCTCGAGGACTACCAAAAGGCTATCATGGAAATTCCTCAAAATCAGCAAGGTCAAATCGC
AAAGAGGTGCGACCTACGGTAGCAACATCTACCTGGATATTACACTAGAGATGAATCCTGACTTGTCTGTTTTGA
AAGCCATGAAATCGCGGATCAGGTCGAGTCTATGCTGGAGGAGCGTTTTGGCGTCTTTGATACCGATGTCATATC
40 AAGCCAGCACCTATCCCTGAGGATGAAATTTAGACAATGTCTATAAAAAATTGCTTATGCGTGAAACAATTGATTG
ACCAAGGAAACCAACTAGAAGAACTCTTGACTGATGATTTTGTCTATATTGCGCAAGATGGAGAGCAGATGGATA
AAGAGGCTTATAAGACCAAAAAAGAGTTAAATCTGCTATCAAGGACATTCAAAATCTCCATCAGTCAAAAAA
CCAACTCATCTGCTATGAGTTAGATGGTATCATCCATACCAGTATCTGGCGTCGCCACGAAACCTGGCAAAATAT
CTTTCATCAAGAAACCAAAAAAGAATAG

4162.1

45 ATGACAATTAAGTAGTAGCAACGGATATGGACGGAACCTTCTAGATGGGAATGGACGCTTTGATATGGATCGT
CTCAAGTCTCTCTTGGTTTCTTACAAGGAAAAAGGATTTACTTTGCGGTAGCTTCGGGTCGGGGATTCTGTCTC
TAGAAAAATTTATTTGCTGGTGTTCGTGATGACATTATTTTCATCGCGGAAAAATGGCAGTTTGGTAGAGTATCAAGG
TCAGGACTTGATGAAGCGACTATGTCTCGTGACTTTTATCTGGCACTTTTGAAGGCTGAAAACTCACCTTAT
50 GTAGATATCAATAAACTGCTCTTGACGGGTAAGAAGGGTTCAATGTTCTAGATACGGTTGATGAGACCTATTGA
AAGTGAGTCAGCACTATAATGAAAAATCCAAAAAGTAGCGAGTTTGAAGATATCACAGATGACATTTTCAAAT
TTACAACCAACTTCACAGAAGAAACGCTGGAAGATGGGAGGCTTGGGTAAACGAAAAACGTTCTGGTGTTAAGG
CCATGACAACTGGCTTTGAATCCATTGATATTGTTCTGGACTATGTCGATAAGGGAGTGGCCATTGTTGAATTAGT
TAAAAAACTTGGTATCACAATGGATCAGGTCATGGCTTTTGGAGACAATCTTAATGACTTACATATGATGCAGGTT
55 GTGGGACATCCTGTAGCTCCTGAAAAATGCACGACCTGAAATTTAGAAATTAGCAAAGACTGTGATTGGTCACCATA
AGGAACGGTCGGTTATAGCTTATATGGAGGGCTTATAA

4162.2

ATGGCAGATATAAAATTGATTGCATTGGACTTGGACGGGACCTTGCTGACTACTGATAAAAGGCTGACGGATCGT
ACCAAGGAAACCTTGCAAGCTGCGCGTATCGTGGTATCAAGGTCGATTGACAACCTGGTCGCTCCCTTAAAGCC
60 ATGGATTCTTTCTCCATGAGTTAGGACTGACGGTCAGGAAGATGAGTATACCATTACTTTTAAATGGTGGATTAG
TTCAGAAAAATACAGGAGAAATCCTTGATAAAACAGTCTTTTCATATGATGATGTGGCACGTTTGTATGAAGAAAC
AGAGAAATATCACTGCCTCTTGATGCCATCTCAGAAGAACAGTTTATCAAATCCAATCGGACCAAGAAAGTCT
TTATGCCAAATTCAATCCAGCTTTGACCTTTGTTCCAGTGGACTTTGAAGACTTATCTAGTCAAATGACCTACAAC
AAATGCGTGACTGCCTTTGCTCAAGAACCTTGGATGCAGCCATTGAGAAGATTTCTCCAGAATTGTTTGACCAAT
65 ATGAAATCTTAAATCACGTGAAATGTTGCTAGAATGGTCACCAAGAATGTTTCATAAAGCAACAGGTTTGGCAA

AACTAATCAGCCATCTTGGAAATCGACCAAAGTCAAGTGATGGCTTGTGGTGACGAGGCCAATGACCTCTCTATGA
TTGAATGGGCAGGTCTTGGTGTGCTATGCAAAACGCTGTTCCCTGAAGTAAAGGCAGCCGCAAAATGTAGTGACGC
CGATGACCAACGATGAGGAAGCTGTCGCCTGGGCTATCGAAGAATATGTGCTAAAGGAGAACTAA

5 4164.2
ATGGAAAGTTTACTTATTCTATTATTAATTGCCAATCTAGCTGGTCTCTTTCTGATTTGGCAAAGGCAGGATAGGC
AGGAGAAACACTTAAGTAAGAGCTTGGAGGATCAGGCAGATCATTGTGACAGCCAGTTGGATTACCGCTTTGACC
AAGCCAGACAAGCCAGCCAGTTAGACCAAAAAGATTTGGAAGTGGTTGTGACGACCGCTTTGCAAGAAGTGCGGA
10 TTGAATTGCACCAAGGTCTGACCCAAGTCCGTCAAGAAATGACAGATAATCTCTCCAAACTAGAGACAAGACAG
ACCAACGTCTCCAAGCCTTGCAGGAATCAAATGAGCAACGTTTGGAAACAAATGCGCCAGACGGTCGAGGAAAAAC
TAGAAAAGACCTTGCAGACACGCTTACAGGCTTCCTTTGAGACAGTTTCTAAACAACCTGGAGTCTGTCAATCGTGG
CCTTGGAGAAAATGCAGACAGTTGCCCGTGATGTCGGAGCTCTTAACAAGGTTCTCTCTGGAACCAAGACGCGAGG
15 GATTCTGGGAGAATTGCAACTGGGGCAAAATTATTGAAGACATCATGACACCTGCCAGTACGAACGAGAATACGC
AACGGTTGAAAACCTCTAGTGAACGAGTGGAGTATGCCATCAAGTTACCCGGACAAGGCGACCAAGAATACGCTA
TCTGCCAATTGACTCTAAGTTTCCACTGGCAGATTATTACCGCTTGGAAAGAAGCCTATGAGACAGGTGACAAGGAT
GAGATTGAACGCTGTGTAAGTCACTCCTAGCAAGCGTCAAGCGCTTTGCTAGGGATTAGGAACAAGTACATA
GCACCACCTCGGACGACCAATTTTGGAGTTTGTGTTTCCGACAGAAGGTCTCTACTCAGAAATCGTCCGCAATC
CGGTCTTCTTTGATGATTGAGACGGGAAGAACAGATTATTGTTGACGAGCAAGTACCCATCAGCCCTTCTTAA
20 CTCCTATCAGTTGGTTTCAAGACCCTTAATATCCAAAAGAGTGCCGACCATATCAGCAAGACTCTTGCCAGTGTC
AAGACCGAGTTTGGCAAGTTTGGTGGTATTCTGGTCAAGGCACAAAACATCTCCAACATGCCTCTGGCAATTG
ATGAATTATTAACCGCTCGTACCATAGCTATCGAGCGGACGCTCCGTACATTGAGTTGTGAGAAGGTGAGCCTGC
GCTTGATCTACTCCATTTTCAAGAAAATGAGGAAGAATATGAAGATTAG

25 4164.3
ATGAAGATTAGTCACATGAAAAAAGATGAGTTATTTGAAGGCTTTTACCTAATCAAATCAGCTGACCTGAGGCAA
ACTCGAGCTGGGAAAAAATACCTAGCCTTTACCTTCCAAGATGATAGTGGCGAGATTGATGGGAAGCTCTGGGAT
GCCCAACCTCATAACATTGAGGCCTTTACCGCAGGTAAAGTTGTCCACATGAAAGGACGCCGAGAAGTTTATAAC
AATACCCCTCAAGTCAATCAAATTACTCTCCGCTGCCTCAAGCTGGTGAACCAATGACCCAGCTGATTTCAAGG
30 TCAAGTCACCAAGTTGATGTCAAGGAAATTCGTGACTACATGTGCAAAATGATTTTCAAAATTTGAAAATCCTGTCTG
GCAACGGATTGTCGAAATCTCTACACCAAGTATGATAAGGAATTCTACTCCTATCCAGCTGCCAAGCAACCA
CCATGCCCTTTGAAACGGGCTTGGCCTATCATACGGCGACCATGGTGGCTTTGGCAGACGCTATTAGCGAAGTTAT
CCTCAGCTCAATAAGAGCCTGCTCTATGCGGGGATTATGTTGCATGACTTAGCTAAGGTACATCGAGTTGACGGGGC
CAGACCAGACAGAGTACACAGTGCAGGTAATCTTCTTGGACATATCGCTCTCATTGATAGCGAAATTACCAAGA
35 CAGTTATGGAACCTCGGCATCGATGATAACGAAGAAGTCGTTTGTGCTCGTCATGTCATCCTCAGTACCCACGG
CTTGTCTGAGTATGGAAGCCCAAGTCCGCTCCAGCATGATTGGAAGCAGAGATTATCCATATGATTGACAATCTGGAT
GCAAGCATGATGATGTCAACAGCTCTTGTCTTGGTGGATAAAGGAGAGATGACCAATAAAATCTTCGCTATG
GATAATCGTTCCTTCTATAAACCAGATTTAGATTAA

40 4166.2
ATGAGTGAAAAAGCTAAAAAAGGGTTTAAAGATGCCTTCACTCTTACACCGTATTATTGATAATCATTGCTATTATGG
CAGTGCTAACTTGGTTTATCCCTGCGGGGGCCTTTATAGAAGGTATTTACGAGACTCAGCCTCAAAATCCACAAGG
GATTTGGGATGTCTCATGGCACCGATTCTGGGCTATGTAGGTACTCATCCAGAGGAAGGTTCTGCTATTAAAGAA
ACGAGCGCAGCGATTGATGTAGCCTTCTTCATCCTTATGGTTGGTGGTTTCTTGGCATTGTCAACAAAACTGGTG
45 CTCTTGACGTAGGGATTGCCTCTATCGTGAAGAAGTATAAGGGCCGCGAAAAAATGTTAATTTTGGTACTGATGCC
TTTGTCTTGGCCTCGGTGGTACAACCTATGGTATGGGTGAAGAAACAATGGCCTTCTATCCACTCCTTGTGCCAGTT
ATGATGGCCGTTGGTTTTGATAGCCTGACTGGTGTGCAATTATTTTGTCTGGTTCTCAAATCGGCTGTTTGGCCTC
TACTCTGAATCCATTTGCGACAGGTATTGCTTCAGCGACTGCGGGAGTTGGTACAGGGGACGGTATCGTACTTCGT
CTGATCTTCTGGGTTACCTTGACTGCTCTTAGTACTTGGTTTGTTTACCGTTATGCGGATAAGATTCAAAAAGATCC
50 GACTAAGTCACTGGTTTATAGTACTCGCAAAGAAGATTGAAACACTTTAACGTAGAAGAATCTTCATCTGTAGAA
TCTACACTTAGCAGCAAAACAAAATCAGTTCTCTTCTTATTTGTGTGACATTCTTGTATGGTATTGAGCTTCAT
TCCATGGACAGACCTTGGCGTTACCATTTTTGATGACTTTAATACTTGGTTGACTGGTCTTCCAGTTATTGGTAATA
TTGTGCGTTCTACTTCTGCACTAGGTACTTGGTACTTCCAGAGGCGCAATGCTCTTGGCCTTATGGGTATC
CTGATTGGTGTATTATATGGTCTTAAAGAAGATAAGATTATCTCTTCTCATGAATGGTGTGCTGACTTGTCTCAG
55 TGTTGCCTTGATCGTAGCGATTGCTCGTGGTATTCAAGTTATCATGAACGACGGTATGATTACCGATACAATCCTC
AACTGGGGTAAAGAAGGCTTGAAGCGGTCTATCTTCAAGTCTTTATCGTTGTAACCTATATCTTCTATCTACCTAT
GTCATTCTTGATCCCATCTTCATCTGGTCTTGGCAGCGCAACTATGGGTATCATGGC
TCCACTTGGAGAAATTTGTAATGTCCGCTCTAGCTTGATTATCACTGCTTACCAATCTGCTTCAAGGTGTCTTGAAC
TGATTGCACCAACATCTGGTATTGTGATGGGAGCTCTTGCACTTGGACGTATCAACATTGGTACTTGGTGGAAATT
60 CATGGGCAAACTCGTAGTCGCTATTATTGTAGTGACCATCGCCCTTCTCTCTTGGAACTTCTTCCATTCCCTAT
AA

65 4166.3
ATGAAAAATAGATATAACAAATCAAGTTAAAGATGAATTTCTTATATCATTAAAAACCTTGATTTCCTATCCTTCAG
TACTCAATGAAGGAGAAAATGGAACACCTTTTGGACAAGCAATCCAAGATGTCCTAGAAAAAATCTTAGAGATTT
GTCGAGACATAGGTTTCACTACCTATCTTGACCCTAAAGGTTATTACGGATATGCAGAAATCGGTGAGGAGCAG

AGCTTCTGGCCATTCTCTGTCATTTGGATGTTGTTCCATCAGGTGATGAAGCAGATTGGCAGACACCGCCATTGGA
AGCAACTATCAAAGACGGCTGGGTATTTCGGACGTGGTGTTCCAAAGATGATAAAGGCCCTTCGCTCGCAGCTCTCTA
TGCAGTAAAAAGCTTGCTGGACCAAGGTATTCAGTTCAAAAAGCGCTACGCTTTATCTTTGGTACCAGTGAAGGA
5 AACCTCTGGCGCTGCATGGCAGCTACAATACCATCGAAGAACAGGCCAGTATGGGCTTTGCACCTGACTCATC
TTTTCTCTGACCTATGCTGAAAAAGGGCTTCTACAGGTCAAAACCTTCATGGCCCTGGATCGGATCAACTAGAGCTT
GAAGTAGGAGGCGCTTTAACGTTGTACCAAGACAAGGCCAACTACCAAGGTCTCCTCTATGAACAGGTTTGTAAAC
GGTCTCAAAGAAGCTGGTTATGATTACCAAACTGAACAAACCGTAACGGTTCTCGGAGTGCCAAAGCATGCT
AAGGATGCTAGTCAAGGTATCAATGCTGTCATCCGACTAGCTACCATTCTTGCTCCTCTCCAAGAACACCCCTGCTC
10 TCAGTTTTCTTGCAACACAAGCAGGTCAAGACGGCACAGGAAGACAAAATCTTTGGTGATATAGCAGATGAACCTT
CTGGTCACCTATCCTTTAATGTGCGCAGGTCTCATGATCAATCATGAACGTTCTGAAATCCGTATTGACATTCGGAC
TCCTGTCTTAGCTGACAAGGAAGAACTAGTAGAGTTGCTTACAAGATGTGCACAAAACCTACCAACTCCGCTACGA
AGAGTTTGACTATCTAGCGCTCTATACGTGCGAGAAGACAGTAACTCGTTAGCACACTGATGCAAACTACTACA
AGAAAAGACTGGCGATAACAGTCTGCTATTTCACTCCGTTGGTCCCACTTTTGCTCGCACCATTGCCAAATTTGTGA
15 GCCTTCGGCGCTTATTCCAGGAGCGAAGCAGACAGAATCATCAGGCAAATGAATGTGCCGTTCTAGAAGATTG
TACCGTGCTATGGATATTTATGCCGAAGCCGTCTATCGACTTGCAACTTAA

4169.1

ATGTCTAATTCATTTGTCAAGTTGTTAGTCTCTCAATTATTTGCAAATTTAGCAGATATTTTCTTTAGAGTAACAAT
CATTGCTAACATATACATTATTTCAAAAATCAGTAATTGCCACACTAGTTCCTATCTTAATAGGAATATCCTCTT
20 TTGTTGCGAGTCTTTTAGTTCCGTTGTTACTAAAAGGTTAGCGCTAAATAGGGTTTTATCTTTATCTCAATTTGGA
AAGACTATATTATTGGCGATACTGGTAGGAATGTTTACCCTAATGCAATCCGTAGCGCCTTTGGTGACCTATCTAT
TTGTTGTTGCAATTTCCATACTAGATGGTTTTGCGAGCACCCGTTTCTATGCTATTGTGCCACGCTATGCGACCGAT
TTGGGTAAGGCTAATTCAGCCTTATCAATGACTGGTGAAGCTGTTCAATTGATAGGTTGGGATTAGGTTGGACTCT
25 TGTGTTGCAACAATTTGGTCTGTTACCTACCAGTGTATCAATTTAGTCTTGTATATCATTTCTAGCTTTCTGATGTTA
TTTCTTCTAACGCTGAAGTGGAGGTGTAGAGTCAAGAACTAATCTTGAATTTTGTCTCAAAGGTTGGAAGTTAG
TTGCTAGAAATCCTAGATTAAGACTTTTGTATCAGCAAAATTTATTTGAAATTTTTTCAAATACGATTGGGTTTCT
TCCATTATACCTGTTTGTAAACGGAGTTATTAAATAAAACGGAAAGTTACTGGGGATATTCTAATACAGCATACT
CTATTGGTATTATAATTAGTGGCTTAATTGCTTTTAGGCTATCTGAAAAGTTCCTTGCTGCTAAATGGGAACCCCA
30 ATTATTCACCCCAATCTAAAAACCATCCAGAATCCTTGCTTAGCTTAGATCCTGGATGGTTCTTTTTTCACCCA
ATGGGTGTTTTTACTAGACAAAAAGAGTTTCCCCTTTATGGTATAAGTGTAAGAAAAAACACAAAAAGAAAG
AACTCACATGAACAGTTTACCAATCATCACTTCCAAAACAGTCTTTTACCAACTATCTTTCAGTGGAGTCA
TTTAACCCAGTATGGTGGTCTTATCTTTTTAGGAACTTTTTCCAGTTGAACTAAAAGAGCGGATTCTAAGT
ATTTAGTAAACGAATGACCAACGCCGCTACTGTGTTATTCGGATTGAGATATCCTTGTCAGTTTCTCTTCAACTG
35 TTAACAGGTTATGGAACGAGCTATGCTTGAAGAAATTTGCTAGCTGATGCCTACTT
TCCAAAATTTGTTGGAAGGAGGGCAGCTTGCTTACAGCCAACCTTATCCCGTTTTCTTCCAGAACTGACGAGGAA
ACAGTCCATAGTTTTCGATGCCTCAACCTTGAATTGGTGAATTTCTTTTACAGTTTACCAGCTAAACCAACTCA
TTGTAGATATCGATTCTACCCATTTACAACTTATGGCAAGCAAGAAGGTGTTGCTTATAACGCCCACTATCGTGC
TCATGGCTATCATCCTCTTTATGCTTTCGAGGGGAAGACAGGTTATTGTTTCAATGCCAGCTTCGCTCTGGTAATC
40 GTTATTGTTCTGAAGAGGCAGACAGCTTTATCACACCTGTTTTAGAACGGTTAATCAACTTCTCTTTCGAATGGA
TAGTGGCTTTGCGACCCCAAAATTATACGATTTAATTGAAAAAACAGGGCAATACTACCTCATAAACTCAAGAA
AAATACTGTTCTGAGCGCTCTTGAGACCTTTCCCTCCCTTGCCACAGGATGAGGACTTAACCATCTTGCCCAAC
TCCGCTACTCAGAACTCTCTATCAAGCAGGATCTTGTCGACAAAGCGTCGTCTGCCAGTTCTCTGAACGAA
AAGAAGGAACTTGTCTACGATGTTATTTCTCTCGTTACAAATATGACGAGTGGAACAAGCCAAGACAGTTTCA
45 GCTTTATCGTGGACGTGGTCAAGCCGAGAAATTTATCAAGGAGATGAAGGAGGGATTTTTTGGCGATAAAACGGA
TAGTTCAACCTTAATCAAAAACGAAGTTGCTATGATGATGAGCTGTATCGCCTACAATCTCTATCTTTTTCTCAAA
CATCTAGCTGGAGGTGACTTCCAACTTTAAACAATCAACGCTTCCGCCATCTTTTTCTTACGTTGGTGGGAAAT
GTGTTCAACAGGACGCAAGCAGCTCCTCAAAATGTCTAGTCTCTATGCCTATTCCGAATTTGTTTTCAGCACTTA
TTCTAGGATTAGAAAAGTCAACCTGAATCTTCTGTTCTTATGAACCACCTAGAAGAAAAGCGTCGTTAATGATG
50 CATTA

4169.3

ATGATGGAGTTTTTTCAACAGCTTCTCATTTAGAGCCATATGGCAATCCTCAGTATTTTGTGTTATGTGATTGCTGC
AACCTTGCCCATCTTTATAGGTCTCTTTTTCAAGAAACGCTTTGCTGGTATGAAGTGTGGTAAGTCTCTCTTTA
55 TTGTCACCATGTTGGTGGGTGGAAAGACCAATCAACTAGCTGCCTTGGGTATTTACCTTTGCTGGGAAATATTGCT
CCTGCTTTTCTACAAGCATTATCGAAAAAGCAAGGATGGCAAGTGGGTCTTCTACTTAGTTAGTTTCTGTCCCTA
CTCCGATTATCTTTGTCAAGGTGCAACCAAGCTATCAATGGAACGCAAGTCTTTGCTTGGGTTCTTGGGAATTTCTTA
CCTGACCTTTCTGTTGCGTTGGAATGTCTACGAGCTGAGAGATGGAGTGATTAAGGATTTTACCCTCTGGGAATTC
CTCCGTTTCTTCTCTCATGCCAACTTTCTCGAGTGGTCCAATCGATCGCTTAAAGCGATTTAATGAAAAATTATCA
60 GGCTATTCTGAGCGAGATGAGTTGATGGATGCTGGATGAATCTGTCCGCTATATCATGTGGGCTTTTGTAT
AAGTTATCTAGCTCATGTTTATAGGAGAGACCTTACTACCTCCTGGAAGAATTTAGCCTTGCAAGTCAAGTGGCT
TCTTTAATCTCTATGCCTTGGCAGTTATGTATACTTTGGTCTGGAACCTCTCTTTGACTTTGCAGGTTATTCTATGT
TTGCTTTGGCCATCTCAAACTTGTATGGGAATCCGTAGCCCTATCAACTTTAAACAAGCCCTTTTTATCAAGGGATTT
AAAGGAGTTTTGGAATCGCTGGCATATGAGTCTGCTCTGTTCCGTGACTTTGCTTTATGCGAATGGTGATG
65 GTGTTAACCAGAAAGAAAGTCTTTAAAAATCGTAATGTAACCTCAAGCATGGCCTACATTGTAATATGCTGATTA
TGGGATTTTGGCATGGTGTGACCTGGTACTATATCGCCTATGGACTCTTTCATGGACTAGGCTTGGTCATCAATGA

TGCCTGGGTTTCGCAAGAAAAAACGCTCAATAAGGAACGGAAAAAGCAGGGAAGGCTGCCCTACCTGAGAATC
GCTGGATTTCAGTTGGCTTGGCATGGTTGCTCACTTCCATGTTGTCATGTTGTCATTCTTAATCTTTCTGGATTCTTGA
ATAATCTATGGTTTAAAAAATAA

5

4169.4

ATGCTTAAACGCTTATGGATGATCTTCGGACCGGTCTTGATCGCTGGTTTGTGGTTTTCTGCTCATTTTCTTTTAT
CCTACTGAGATGCATCATAATCTAGGAGCTGAAAAGCGTTTCAGCAGTGGCTACTACTATCGATAGTTTAAAGGAGC
GAAAGTCAAAAAGTCAGAGCACTATCTGATCCAAATGTGCGTTTTGTTCCTTCTTTGGCTCTAGTGAATGGCTTCG
TTTTGACGGTGCTCATCCTGCGGTATTAGCTGAGAAAACAATCGTTCCTACCGTCTTATCTTTTAGGACAGGGG
GGAGCTGCATCGCTTAACCAATATTTTGGAAATGCAACAGATGTTACCACAGCTGGAGAATAAAACAAGTTGTGTAT
GTTATCTCACCTCAGTGGTTTCAGTAAAAATGGCTATGATCCAGCAGCCTTCCAGCAGTATTTAATGGAGACCAGT
TGACTAGTTTTCTGAAACATCAATCTGGGGATCAGGCTAGTCAATATGCAGCGACTCGCTTACTGCAACAGTTCCC
AAACGTAGCTATGAAGGACCTGGTTTCAGAAGTTGGCAAGTAAAGAAGAATTGTCGACAGCAGACAATGAAATGAT
TGAATTATTGGCTCGTTTTAATGAACGCCAAGCTTCTTTTTTGGTCAGTTTTCGGTTAGAGGCTATGTTAACTACG
ATAAGCATGTAGCTAAGTATTTAAAAATCTTGCCAGACCAGTTTTCTTATCAGGCAATAGAAGATGTTGTCAAAGC
AGATGCTGAAAAAATACTTCCAATAATGAGATGGGAATGGAAAATTATTTCTATAATGAGCAGATCAAGAAGGA
TTTGAAGAAATTAAGGATTCTCAGAAAAGCTTTACCTATCTCAAGTCGCCAGAGTATAATGACTTCAGTTGGTT
TTAACACAGTTTTCTAAATCTAAGGTAAACCCGATTTTTATCATTCCACCTGTTAATAAAAAATGGATGAACTATG
CTGGTCTACGAGAGGATATGTACCAACAAACGGTGCAGAAAGATTGCTACCAGTTAGAAAAGTCAAGGTTTTACCA
ATATAGCAGATTTTTCTAAGGACGGCGGGAGCCTTTCTTATGAAGGACACCATTACCTTGGTTGGTTGGGTTG
GTTGGCTTTTGACAAGGCAGTTGATCTTTCTATCCAATCCCACACCAGCTCCGACTTACCATCTGAATGAGCGC
TTTTTCAGCAAAGATTGGGCGACTTATGATGGAGATGTCAAAGAATTTCAATAG

10

15

20

25

4169.6

ATGGAGAAAAACCTCAAGGCTTTGAAACAAACAACAGACCAAGAAGGCCAGCAATTGAACCTGAAAAGGCAGA
GGATACCAAGACAGTCCAAAAATGGTTACTTCGAGGATGCAGCTGTCAAGGACCGCACCTTGAGTGACTATGCAGG
TAACTGGCAATCAGTTTATCCTTTCCTTGAAGACGGCACGTTTGACCAAGTCTTTGACTACAAGGCTAAGTTGACT
GGTAAGATGACCCAGGCTGAGTACAAGGCTTACTATACAAAAGGCTATCATAACAGATGTGACTAAGATTAACATT
ACTGATAATACTATGGAATTTGTTCAAGGTGGACAAAGCAAGAAATACACTTACAAGTATGTCGGTAAGAAAATT
TTGACTTACAAGAAAGGCAATCGTGGCGTGCCTTTCTTGAAGCCACAGATGCTGACGCTGGACAATTTCAAGT
ATGTTTCAGTTTATGAGCCACAATGTTGCCCGAGTTAAGGCAGAACATTTCCATATCTTCTTTGGAGGCACAAGCCA
AGAAAGCCCTCTTTGAAGAAATGGACAACCTGAGCAACCTACTACCCAGATAACCTATCTGGCCAAGAAATCGCCCA
AGAAATGTTGGCGCATTGA

30

35

4170.3

ATGAAAGATGGTCATTTGCTAGCCCATCATATTCGTTTGTGTAATGGGCGGATTTTTCAAAAGTTACTGAGTCAAG
ATCCTGAGGCTCTTTATAGGGGTGAACAGGGCAAGATTTTAGCGGTTTTATGGAATAGTGAACCTGGCTGCGCAA
CTGCGACAGATATCGCGCTTTCGACTGGCTTGCAGTATGCGAATAATACGCTGACGACTATGATAAAAAAGTACGGC
AAAAGCTTGTAATTTAGTCCGTGTGGAAAAGACAAGCGTAAAGAGTATTTAGTTTAAACGGAGTTAGGCAAGT
CCCAGAAAGAAGTGGGGCATCGTGTGAGTCAGAAATTGGATACTATCTTTTACAAAGGATTTTCAGAGGAAGAAA
TTCACCAATTTGAAGGTTTTCAAGAAAGAATTTTGGCGAATCTGAAAGAGAAGGGAATGAGGTTTAG

40

45

4170.4

ATGACTAATTTAATTGCAACTTTTCAGGATCGTTTTAGTGATTGGTTGACAGCTCTATCTCAACATTTGCAGTTGTC
GCTTTTGACCTTGTTACTAGCTATTTTGCTTTCGATTCCCTTGGCTGTTTTCTTCGCTATCATGAGAAGCTGGCCG
ACTGGGCTTTCAGATTGTCAGGTATTTTCAGACCATCCCGTCTTGGCCTTGTGGGGCTCTTTATCCCTTTGATG
GGAATTTGGGACCTTGCCGGCTTTGACAGCTCTAGTGATTATGCGATTTCCCTATTTTGCAAAATACTATCACTG
GGCTGAAGGGAATTGATCCGAACCTGCAAGAGGCTGGGATTGCCTTTGGGATGACCAGATGGGAACGTCTCAAGA
AATTTGAAATTCCACTCGCCATGCCTGTTATCATGTCTGGGATTTCGGACGGCAGCTGTTTTGATTATCGGTACGGC
AACCTTGGCGGCCTTGATTGGTGCAGGGGACTAGGTTCCCTTTATTCTTTTGGGAATTGACCGTAATAATGCCAGT
TTGATTTTGATTGGGGCACTTTCTTCTGCAGTGCTAGCCATTGCCTTTAACTTCTCTACTAAAAGTGATGGAAAAAG
CAAAATTACGGACGATTTTCTCAGGTTTTGCCTTGGTGGCTTTATTACTGGGTCTGTCTTATAGTCCAGCTCTTTTG
GTTCAAAAAGAGAAGGAAAACTTGGTTATTGCTGGGAAAAATAGGTCCAGAACCAAGAAATTTGGCCAATATGTAT
AAGTTGCTGATTGAAGAAAATACCAGCATGACTGCGACTGTTAAACCGAATTTTGGGAAGACAAGCTTCTCTTATG
AAGCTCTGAAAAAAGGCGATATTGACATCTATCCTGAATTTACTGGTACGGTGAAGGTTTGGCTTCAACCATC
ACCCAAGGTGAGTCATGAACCAGAACAGTTTATCAGGTGGCGCGTGATGGCATTGCTAAGCAGGATCATCTAGC
CTATCTCAAACCCATGTCTTATCAAAACACCTATGCTGTAGCTGTTCGAAAAAAGATTGCTCAAGAAATAGGCTTG
AAGACCATTTTCAGACTTGAAAAAAGTGAAGGGCAGTTGAAGGCAGGTTTTACTCGAGTTTAAACGACCGTGAA
GATGGAAATAAGGGCTTGCAATCAATGTATGGTCTCAATCTCAATGTAGCGACCATTTGAGCCAGCCCTTCGCTATC
AGGCTATTTCAGATCAAGGGATATTCAAAATCAGGATGCCCTATTCGACTGATGCGGAATTGGAGCGTTATGATTACA
GGTCTTGGAAAGATGACAAGCAACTCTTCCACCTTATCAAGGGGCTCCACTCATGAAAGAAGCTCTTCTCAAGAA
ACACCCAGAGTTGGAAGAGTTCTTAATACATTGGCTGGTAAGATTACAGAAAGCCAGATGAGCCAGCTCAACTA
CCAAGTCGGTGTGTAAGGCAAGTCAGCAAAGCAAGTAGCCAAGGAGTTTCTCCAAGAACAGGTTTGTGTAAGAA
ATGA

50

55

60

65

4170.5

ATGATGCATACTTATTTGCAAAAAGAAAATTGAAAATATCAAAAACAACCCTAGGTGAAAATGTCAGGTGGTTACCGT
CGTATGGTTGCGGCTATGGCTGATTAGGATTTTCAGGAACATGAAGGCTATCTGGGATGACCTCTTTGCCCATC
GTAGTTTGGCCAGTGGATTTATTTGCTGGTTTTAGGAAGTTTTCTCTCTGGCTGGAGTTGGTTTACGAACATCGT
ATTGTTGACTGGATTGGGATGATTGTAGCTTGACAGGGATTATCTGTGTAATCTTTGTATCGGAAGGTCGAGCAA
GTAATTATCTTTTTGGCTTGATTAACTCTGTTATTTACCTTATTTTGGCCCTACAGAAAGGCTTTTATGGTGAGGTG
CTGACGACACTTTACTTCACAGTCATGCAGCCAATTGGACTTCTAGTTTGGATTTATCAGGCACAGTTTAAAGAAGG
AAAAGCAGGAGTTTGTGCGCGCTAAACTGGACGGCAAGGGCTGGACAAAAGTATCTTTCCATTAGTGTGCTTTGGT
GGTTGGCCCTTTGGCTTCATTTATCAGTCTATTGGTGGCAATCGTCCCTATCGTGATTCAATCACAGATGCAACCAA
TGGGGTAGGGCAAATCCTCATGACAGCTGTTTACCGTGAACAGTGGATATTCTGGGCGGCTACCAATGTCTTTTCA
ATCTATCTCTGGTGGGGAGAAAGCCTGCAAAATTCAAGGGAAATATCTAATTTATCTCATTAACAGTCTAGTTGGTT
GGTATCAATGGAGCAAGGCAGCTAAGCAGAATACTGATTACTTAACTAG

4170.6

ATGAGAAATATGAAGGCAAAAATATGCTGTTTGGGTGGCTTTTTCTTAAATTTGACTTATGCCATTGTTGAGTTTAT
TGCAGGTGGAGTATTTGGTTCTAGCGCTGTTCTTGCTGACTCTGTGCATGACTTGGGAGATGCGATTGCAATTGGA
ATATCAGCTTTTCTAGAAACAATCTCCAATCGTGAAGAAGACAATCAGTACACCTTTGGGCTATAAGCGGTTTAGCC
TGCTAGGAGCCTTGGTAACAGCTGTGATTCTCGTAACGGGCTCTGTTCTAGTCATTTTGGAAAAATGTCACGAAGAT
TTTGCATCCGCAACCAAGTCAATGATGAGGGGATTCTCTGGTTAGGAATTATTGCGATTACTATCAATCTGTTAGCG
AGTCTGGTGGTTGGTAAGGGAAAGACAAAAGAAATGAAGTCTAGTCTATTCTGAGTCTGCATTTTCTGGAAGATACGCTAGGG
TGGGTAGCTGTTATCCTGATGGCGATTGTTCTTCGATTACGGACTGGTATATCCTAGATCCTCTTTTGTCCCTTGT
CAATTTCTTTCTTTATTTCTTTCAAAGCCCTTCCACGTTTTTGGTCTACACTCAAGATTTTCTTGGATGCTGTGCCAG
AAGTCTTGTATCAAGCAAGTAAAGAGTGGCCTGGAGCGATTGGACAATGTGGCCAGCCTTAATCAGCTTAATC
TCTGGACTATGGATGCTTTGGAAAAAAATGCCATTGTCCATGTTTGTCTAAAAGAAATGGAACATATGGAACCTTG
TAAAGAGTCTATTGCAATTTTCTTAAAAGATTGTGGTTTTCAAATATTACCATTGAAATTGATGCTGACCTAGAA
ACTCACCAACCATAAGCGAAAGGTGTGTGACTTGGAACGGAGTTATGAGCATCAACATTAG

4170.8

ATGATTGAATACAAAAATGTAGCACTGCGCTACACAGAAAAGGATGTCTTGAGAGATGTCAACTTACAGATTGAG
GATGGGGAATTTATGGTTTTAGTAGGGCTTCTGGGTGAGGTAAGACGACCATGCTCAAGATGATTAACCGTCTTT
TGAAACCAACTGATGGAAATATTTATATGGATGGGAAGCGCATCAAAGACTATGATGAGCGTGAACCTTCGTCTTT
CTACTGGTTATGTTTTACAGGCTATTGCTCTTTTCCAATCTAACAGTTGCGGAAAAATATTGCTCTCATTCTGAA
ATGAAGGGGTGGAGCAAGGAAGAAATTACGAAGAAAACAGAAGAGCTTTTGGCTAAGGTTGGTTTACCAGTAGCC
GAGTATGGGCATCGCTTACCTAGTGAATTATCTGGTGGAGAACAGCAACGGGTCGGTATTGTCCGAGCTATGATTG
GTCAGCCCAAGATTTTCTCATGGATGAACCTTTTGGGCTTGGATGCTATTTGAGAAAAACAGTTGCAGGTTCT
GACAAAAGAATTGCAATAAGAGTTTGGGATGACAACGATTTTGTAAACCATGATACGGATGAAGCCTTGAAGTT
GGCGGACCGTATTGCTGTCTTGCAAGATGGAGAAATTCGCCAGGTAGCGAATCCCGAGACAATTTTAAAAGCGCC
TGCAACAGACTTTGTAGCAGACTTGTGGAGGTAGTGTTCATGACTAA

4171.1

ATGTCAGCAGTTGCTATTTTCACTATGACCAAGGTTATGCAAGAAACCCACGGAAATCCTTCTAGTATTCATGGTC
ATGGTCGTCAAGCTGGCAAACTCTTGGGAGAAGCCCGTCAGGAACCTAGCCAGTTACTAAGGACAAAACCTCAAC
ATATCTTTTCACTTCTGGTGGGACTGAAGGCAATAATACTACCATCATTGGCTACTGTCTTCGTACCAAGAACA
AGGAAAAACATATCATCAAACTGCCATCGAGCACCATGCTGTCCTTGAACAATTGATTACTTGGTTCAACACTTT
GGGTTTGAAGCAACCATTATCCAGCCAGAAAAATCAAGAAATCACAGCCAGCAAAATCAAAAAGGCTTTACGTGAC
GATACGATTTTGGTTTCTACCATGTTTGTCAATAATGAGACAGGAAACCTACTGCCCATCGCTGAAATTGGCCAAA
TACTCAAGCAACACCCTGCTGCCTATCATGTTGATGCAGTTCAGGCTATTGGTAAAAATCCCAATTCATTCAAGA
ATTGGGCATTGATTTTCTACTGCTTCTGCCCAAAATCCATGGTCTTAAGGGAATCGGTTTTCTTACGCATCTA
GCATGGACTTTGATTCTTATCTACATGGCGGAGACCAGGAACAGAAAAAACGTGCAGGAACTGAAAAATCTGCCTG
CCATTGTAGGCATGGTTGCAGCCCTAAAAGAAGACCTAGAAAAACAAGAAGAACATTTTCAACATGTACAAAATC
TAGAAACTGCCTTTCTGGCAGAGCTGGAGGGCATTCACTATTACCTGAATAGAGGAAAAACATCATCTCCCTTATGT
TCTCAATATTGGATTTCCTGGTCAAGAAAAATGACCTCTTACTCCTTCGGCTAGATTTAGCTGGAATTTCAATCTCTA
CTGGCTCAGCCTGTAATGCAGGCGTTGTCCAATCCAGCCATGTTCTTGAAGCCATGTATGGCGCAAAATTCAGAACG
CTTGAAGGAATCCCTTCGCATCAGTTTGTGCCACAAAATACCGTTGAAGACCTACAAACCCTCGCAAAAACCTTA
AAAGAAATTATCGGAGGTTAG

4172.1

ATGTTATTCAAATTATCTAAGGAAAAAATAGAGCTAGGCTTATCTCGTTTATCGCCAGCCCGTCGTATTTTTTGA
GTTTTGCCCTTGGTCATTTTACTAGGCTCTCTTTTGGAGCTTGCCCTTTGTCCAAGTTGAAAGCTCAGCAGCGACT
TATTTTGAATCTTTTCACTGCTGTCTCTGAGTCTGTGTGACGGGTCTCTCAACCCTTCCAGTAGCTCACACCTA
TAATATCTGGGGTCAAATAATCTGTTTGTCTTGTATTGATCAGATCGGTGGTCTAGGGCTCATGACCTTTATTGGGGTTT
TCTATATCCAGAGCAAGCAAAAAGCTTAGTCTTCGTAGCCGTGCAACTATTCAGGATAGTTTTAGTTATGGAGAAAC

TCGATCTTTGAGAAAAGTTTGTCTATTCTATTTTCTCACGACCTTTTGGTTGAGAGCTTGGGAGCTATTTTGCTTA
GTTTTCCGCTTATTCCTCAACTTGGCTGGGGACGTGGTCTTTTGTAGTTCCATTTTCTAGCGATCTCAGCCTTCTGT
AATGCCGGTTTGTATAATTTAGGGAGCACCAGTTTATTTGCTTTTCTAGACCGATTTACTGGTCAATCTGGTGATTGC
AGGCTTGATTATTACAGGCGGCCTTGGTTTTATGGTCTGGTTTGATTGGCTGGTCATGTAGGAAGAAAAGAAAAA
5 GGACGTCTGCACCTTTCATACGAAGCTTGACTATTATTGACTATAGGTTTGTGTTATTGGAACAGCAACTACTCT
CTTTCTTGAGTGGAAACAATGCTGGAACGATTGGCAATCTCCCTGTTGCCGATAAGGTTTTAGTTAGCTTTTTC
ACAGTGACGATGCGAACAGCTGGCTTTTCTACGATAGATTATACTCAGGCTCATCTGTGACTCTTTTGATTATA
TCTTACAGATGTTTCTAGGTGGGGCACCTGGAGGAACAGCTGGGGGACTCAAGATTACGACATTTTGTCTCTT
GGTCTTTGCACGAAGTGAGCTTCTAGGCTTGCCTCATGCCAATGTTGCGAGACGAACGATCGCGCCGCGAACGGTT
10 CAAAAATCCTTTAGTGTCTTTATTATCTTTTGTAGTCTTTGATAGGCTTCTTGATAGGATTGATTCTGCTAGGGATAACAGCCAA
AGGCAATCCTCCCTTTATCCACCTCGTATTTGAAACCATTTCAGCTCTTAGTACAGTTGGTGTAACGGCAAACTCG
ACTCCTGACCTTGGGAAATTGGCTCTCAGTGTTATCATGCCACTTATGTTTATGGG
ACGAATTGGTCCCTTGACCTTGTGTTAGCTTGGCAGATTACCATCCAGAAAAGAAAGATATGATTCACTATATG
AAAGCAGATATTAGTATTGGTTAA

4172.2
ATGTCAGATCGTACGATTGGAATTTTGGGCTTGGGAATTTTGGGAGCAGTGTCCTAGCTGCCCTAGCCAAGCAGG
ATATGAATATTATCGCTATTGATGACCACGCAGAGCGCATCAATCAGTTTGAGCCAGTTTTGGCGCTGGAGTGAT
20 TGGTGACATCACAGATGAAGAATTATTGAGATCAGCAGGGATTGATACCTGCGATACCGTTGTAGTCGCGACAGG
TGAAAATCTGGAGTCGAGTGTGCTTGGCGTTATGCACTGTAAGAGTTTGGGGTACCGACTGTTATTGCTAAGGTC
AAAAAGTCAGACCGCTAAGAAAAGTGTAGAAAAGATTGGAGCTGACTCGGTTATCTCGCCAGAGATGAAATGGGG
CAGTCTCTAGCACAGACCACTTCTTTCCATAATAGTGTGATGCTTTTCAGTTGGATAAAAAATGTGTCTATCGTGG
AGATGAAAATTCCTCAGTCTTGGGCAGGTCAAAGTCTGAGTAAATTAGACCTCCGTGGCAAATACAATCTGAATA
TTTTGGGTTCCGAGAGCAGGAAAATCCCATTTGGATGTTGAATTTGGACCAGATGACCTCTTGAAGCAGATAC
25 CTATATTTTGGCAGTCATCAACAACCAAGTATTTGGATACCTAGTAGCATTGAATTCGTAA

4172.3
ATGAAGTTATTGTCTATCGCAATTTCTAGCTATAATGCAGCAGCCTATCTTCATTACTGTGTGGAGTCGCTAGTGA
30 TTGGTGGTGAGCAAGTTGGGATTTTGATTATCAATGACGGGTCTCAGGATCAGACTCAGGAAATCGCTGAGTGTTT
AGCTAGCAAGTATCCTAATATCGTTAGAGCCATCTACAGGAAAATAAATGCCATGGCGGTGCGGTCAATCGTGG
CTTGGTAGAGGCTTCTGGGCGCTATTTTAAAGTAGTTGACAGTGATGACTGGGTGGATCCTCGTCCCTACTCTGAAA
ATTCTTGAAACCTTGACGGAACCTTGAGAGCAAAAGGTCAAGAGGTGGATGTCTTTGTGACCAATTTTGTCTATGAAA
AGGAAGGGCAGTCTCGTAAGAAGAGTATGAGTTACGATTACGTCTTGCCTGTTCCGGCAGATTTTGGCTGGGACCA
35 GGTCCGAAATTTCTCAAAGGCCAGTATACCATGATGCACTCGCTGATTTATCGGACAGATTTGTTGCGTGCTAGC
CAGTTCTAA

4172.4
ATGAAATTCAATCCAAATCAAAGATATACTCGTTGGTCTATTCCCGCTCTCAGTGTCGGTGTTGCCTCAGTTGTTG
40 TGGCTAGTGGCTTCTTTGTCTAGTTGGTCAGCCAAGTTCTGTACGTGCCGATGGGCTCAATCCAACCCAGGTCA
AGTCTTACCTGAAGAGACATCGGGAACGAAAGAGGGTGACTTATCAGAAAAACAGGAGACACCGTTCTCACTCA
AGCGAAACCTGAGGGCGTTACTGGAAATACGAATTCATTCCGACACCTACAGAAAGAACTGAAGTGAGCGAGGA
AACAGCCCTTCTAGTCTGGATACACTTTTTGAAAAAGATGAAGAAGCTCAAAAAAATCCAGAGCTAACAGATGT
CTTAAAAAGAACTGTAGATACAGCTGATGTGGATGGGACACAAGCAAGTCCAGCAGAACTACTCCTGAACAAGT
45 AAAAGGTGGAGTGAAAGAAAAATACAAAAGACAGCATCGATGTTTCTGCTGCTTATCTTGAAAAAGCTGAAGGGAA
AGGTCTTTTCACTGCCGGTGTAACCAAGTAATTCCTTATGAACTATTCGCTGGTGATGGTATGTTAACTCGTCTA
TTACTAAAAGCTTCGGATAATGCTCCTTGGTCTGACAATGGTACTGCTAAAAATCCTGCTTTACCTCCTCTTGAAG
GATTAACAAAAGGGAAATACTTCTATGAAGTAGACTTAAATGGCAATACTGTTGGTAAACAAGGTCAAGCTTAA
TTGATCAACTTCGCGCTAATGGTACTCAAACTTATAAAGCTACTGTTAAAGTTTACGGAATAAAGACGGTAAAGC
50 TGACTTGACTAATCTAGTTGCTACTAAAAATGTAGACATCAACATCAATGGATTAGTTGCTAAAGAAAACAGTTCAA
AAAGCCGTTGCAGACAACGTTAAAGACAGTATCGATGTTCCAGCAGCCTACCTAGAAAAAGCCAAGGGTGAAGGT
CCATTACAGCAGGTGTCAACCATGTGATTCCATACGAACCTCTTCGACAGGTGATGGCATGTTGACTCGTCTCTTGC
TCAAGGCATCTGACAAGGCACCATGGTCAGATAACGGCGACGCTAAAAACCCAGCCCTATCTCCACTAGGCGAAA
ACGTGAAGACCAAAAGGTCAATACTTCTATCAAGTAGCCTTGGACGGAAATGTAGCTGGCAAAAGAAAAACAAGCGC
55 TCATTGACCAGTTCCGAGCAAATGGTACTCAAACTTACAGCGCTACAGTCAATGTCTATGGTAACAAAAGACGGTA
AACCAGACTTGGACAACATCGTAGCAACTAAAAAGTCACTATTAACATAAACGGTTAATTTCTAAAGAAACAG
TTCAAAAAGCCGTTGCAGACAACGTTAAAGACAGTATCGATGTTCCAGCAGCCTACCTAGAAAAAGCCAAGGGTG
AAGGTCCATTACAGCAGGTGTCAACCATGTGATTCCATACGAACTCTTCGACAGGTGATGGTATGTTGACTCGTCT
CTTGCTCAAGGCATCTGACAAGGCACCATGGTCAGATAACGGTGACGCTAAAAACCCAGCCCTATCTCCACTAGG
60 TGAACACGTGAAGACCAAGGTCAATACTTCTATCAATTAGCCTTGGACGGAAATGTAGCTGGCAAAAGAAAAACA
AGCGCTATTGACCATTCGAGCAACGGTACTCAAACTTACAGCGCTACAGTCAATGTCTATGGTAAACAAAGA
CGGTAAACCAGACTTGGACAACATCGTAGCAACTAAAAAGTCACTATTAACATAAACGGTTAATTTCTAAAGA
AACAGTTCAAAAAGCCGTTGCAGACAACGTTAAGACAGTATCGATGTTCCAGCAGCCTACCTAG

4172.5

ATGAAACTAAAAAGTTATATTTTGGTTGGATATATTATTTCAACCCTCTTAACCATTTTGGTTGTTTTTGGGCTGT
TCAAAAAATGCTGATTGCGAAAGGCGAGATTTACTTTTGGCTTGGGATGACCATCGTTGCCAGCCTTGTCGGTGCT
GGGATTAGTCTCTTTCTCCTATTGCCAGTCTTTACGTCGTTGGGCAAACCTCAAGGAGCATGCCAAGCGGGTAGCGG
CCAAGGATTTTCCCTCAAATTTGGAGGTTCAAGGTCCTGTAGAATTTAGCAATTTAGGGCAAACCTTTAATGAGAT
5 GTCCCATGATTTGCAGGTAAGCTTTGATTCTTGGGAAGAAAGCGAACGAGAAAAAGGGCTTGATGATTGCCAGTT
GTCGATGATATTAAGACTCCTATCACTTCGATCCAAGCGACGGTAGAAGGGATTTTGGATGGGATTATCAAGGA
GTCGGAGCAAGCTCATTATCTAGCAACCATTGGACGCCAGACGGAGAGGCTCAATAAACTGGTTGAGGAGTTGAA
TTTTTTGACCCTAAACACAGCTAGAAATCAGGTGGAAACTACCAGTAAAGACAGTATTTTCTGGACAAGCTCTTA
10 ATTGAGTGCATGAGTGAATTTGAGTTTGGATTGAGCAGGAGAGAAGAGATGTCCACTTGCAGGTAATCCAGAGT
CTGCCCGGATTGAGGGAGATTATGCTAAGCTTTCTCGTATCTTGGTGAATCTGGTGCATAACGCTTTTAAATATTC
TGCTCCAGGAACCAAGCTGGAAGTGGTGGCTAAGCTGGAGAAGGACCAGCTTTCAATCAGTGTGACCGATGAAGG
GCAGGGTATTGCCCCAGAGGATTGGAAAAATATTTCAAACGCCTTTATCGTGTGAAAACCTTCGCGTAACATGAAG
ACAGGTGGTCAATGATTAGGACTTTCGATTGCGCGTGAATTTGGCCCATCAATTGGGTGGGAAATCACAGTCAGC
15 AGCCAGTACGGTCTAGGAAGTACCTTTACCCTCGTTCTCAACCTCTCTGGTAGTAAAAATAAAGCCTAA

4172.6
ATGTTTGGTCAAACGGCTCAACATGGTCTTACGAATAGCCTGAAAGACTTCTGGATTTTCTGCTGAATATAGGTC
CACAATTGGCGTTTTTTTGGCAGATGCTCCGCTGTTCCAGATCGGTTGAGCAGGGTACTGGAAATCACCGTCGTGA
20 GTTCAATATGATTACAGCAGATATTCTCGCATTTTGGGATGACTCACTTGGGACAAATCAAGTTGGTCTATCAAGAG
TCGATTGACCTTGAGTTGCTGGTCAATGCATTAATCATCACTTGTCTATTGACAGACTGGTCCACGCCCCAATC
AAATAACGATAGAAATCGACAGGCAGATAGTACATGGTCTTGACCTGCTGAAGGGGCGTAAAGACAAAGAGATTA
TCGACATAAAAAAGTATGTTCAAGGCAGTTAGAACTGGCTAGCACGCAACAAATCTGTCCGATAAATCAGCGAGTGC
ATCATGGTATACTGGCCTTTGGAGAAATTTCCGACCTGGTCCCAGCCAAAAATCTGCCGAACAGGCAAGACTGA

4174.1
ATGGAACATTTAGCAACTTATTTTCAACCTATGGAGGAGCTTTCTTCGCTGCATTGGGAATTGTATTGGCGGTTG
GATTAAGCGGTATGGGGTCTGCTTATGGAGTTGGTAAGGCTGGGCAATCTGCCGCAGCTTTACTGAAAGAACAGC
30 CTGAAAAGTTTGCCTCAGCTTTGATATTGCAATTATTGCCCGGAACACAAGGATTATATGGTTTGTATTGGAAT
TTTAATTTGGTTGCAATTAACCTCCAGAACTTCTTTAGAAAAAGGCGTTGCTTATTTCTTGTAGCTCTTCCAATTG
CTATTGTAGGATACTTTTCACTAAGCATCAAGGAAATGTAGCAGTAGCGGGAATGCAAATCTTGGCTAAAAGAC
CAAAAGAAATTCATGAAGGAGCAATTTTAGCTGCCATGGTAGAAACCTATGCAATTTCTGCTTTTGTGCTATCATT
CATTTTGACCCTTCGTGTATAA

4175.2
ATGTTAAAAATCAGAAAAACAATCACGTTATCAAATGTTAAATGAAGAATTGTCCTTCCTATTGGAAGGCGAAACC
35 AATGTTTTGGCTAATCTTTCCAACGCCAGTGCTCTCATAAAATCACGTTTTCTTAATACCGTATTTGCAGGCTTTTA
TTTGTTCGATGGAAAGGAATTGGTTTTAGGCCCTTCCAAGGAGGTGTTTCTGTCATCCGTATTGCACTAGGCAAG
GGTGTTTGTGGTGAGGCAGCTCACTTTCAAGGAACTGTTATTGTTGGAGATGTGACGACCTATCTCAACTATATTT
CTTGTGATAGTCTAGCTAAAAGTGAAATTTGGTGCCGATGATGAAGAATGGTCAGTTACTTGGAGTTCTGGATCT
40 GGATTCCTCAGAGATTGAGGATTACGATGCTATGGATCGAGATTATTGGAACAATTTGTGCTATTTTGTCTTGAA
AAGACAGCATGGGACTTTACGATGTTTGGAGAAAAATCTTAA

4175.3
ATGTCAGTATTAGAGATCAAAGATCTTCACGTTGAGATTGAAGGAAAAAGAAATTTTAAAAGGGGTTAACCTGACC
45 CTGAAAAACAGGAGAAATTGCCGCTATCATGGGACCAAAATGGTACAGGTAATCGACTCTTCTGCCGCTATCATG
GGAAATCCAAACTATGAAGTAACTAAAGGTGAAGTTTGTTTGATGGCGTAAACATCCTTGAGTTGGAAGTGGAT
GAGCGTGCGCTATGGGACTTTTCTTGTATGCAATACCCATCAGAAATCCCTGGAATTACCAATGCTGAGTTTC
TTCGTGCCGCTATGAATGCGGGTAAAGAAGATGATGAGAAGATTTCACTTCGTGAGTTTATTACTAAGCTAGATGA
AAAAATGGAATTGCTCAACATGAAAGAAGAAATGGCAGAGCGTTACCTCAACGAAGGCTTCTCTGGTGGTGAGAA
50 AAAACGCAATGAAATTTCTCAACTTTTGTATGTTGGAGCCAACATTTGCTCTTTGGACGAGATTGACTCAGGTCTT
GATATTGACGCTCTTAAAGTTGTGTCTAAAGGTGTCAATGCCATGCGTGGTGAAGGTTTTGGTGTATGATCATCA
CTCACTACCAACGTCTTTTGAACATATCACACCTGATGTTGATACACGTGATGGAAGGTCGTGTGCTCTTC
TGGTGGTCCAGAATTGGCTGCGGCTTTGGAACGTGAAGGATACGCAAAATAGCTGAAGAATTGGCTACGACTA
CAAGGAAGAATTGTAA

4174.4
ATGCCCTACAAAAGACAAAGGAGTTTTTCAATGGCACTTTCTAACTAGATAGCCTTTATATGGCAGTGGTAGCAG
55 ACCATTTCGAAAAATCCACATCACCAAGGGAAGTTAGAAGATGCTGAGCAAAATCAGTCTCAACAAATCCGACTTGTG
GGGATGTCATCAACCTCTCTGTCAAGTTTGTATGACAGAGGACCGTTTGGAAAGATATTGCTTTTCTAAATTCAGGATG
CACGATTTCAACTGCTTCTGCTAGTATGATGACAGATGCCGTTTTAGGAAAAACCAAAACAAAGAAATTTAGAACTG
60 GCGACTATTTTTCTGAAATGGTTCAAGGGCAAAAAGATGAGCGTCAAGACCAACTTGGAGACGCGGCACTTCTTG
TCAGGTGTTGCCAAATTCCTCAAAGAATCAAGTGTGCAACCCTAGCTTGAATGCCCTTAAGAAAAACAATTGAA
AATCAAGAAAAACAGTAA

4175.5

ATGAAAATTCAAGACCTATTGAGAAAAGATGTCTGTTGCTAGATTTGCAGGCAACTGAAAAAACAGCTGTCATC
GACGAGATGATTAAAAATTTGACAGACCAGGTTATGTAACAGATTTTGAACATTTAAAGAAGGAATTTGGCG
CGTGAAGCTTTGACTTCTACTGGTTTGGGTGATGGAATCGCAATGCCTCACAGCAAAAACGCTGCTGTCAAAGAA
5 GCGACAGTTCTATTTGCTAAGTCAAATAAGGGTGTGACTACGAGAGCTTGGATGGACAAGCAACTGACCTCTTCT
TCATGATTGCAGCTCCAGAAGGTGCCAATGATACTCACTTGGCAGCCTTGGCAGAATTGTCTCAATACTTGATGAA
AGACGGTTTTTGACAGACAACTTCGTCAAGCAACATCTGCAGACCAAGTTATCGAACTTTTTGACCAAGCTTCAGAA
AAAACTGAGGAACCTGTTCAAGCACCTGCTAATGACTCTGGTGACTTTATCGTAGCTGTTACAGCTTGTACAACAG
GTATTGCCCACTTACATGGCCCAAGAAGCCCTTCAAAAAGTAGCTGCTGAAATGGGGGTTGGTATCAAGGTG
10 AAACCAACGGTGCTAGCGGTGTTGGAATCAACTACGAGAAAGATATCCGTAAGGCTAAAGCTATTTATCATTG
CAGCAGACAAGGCCGTTGAAATGGATCGATTTGATGGAAGCAATGATCAATCGTCCAGTTGCTGACGGTATCC
GTAAGACAGAAGAGCTAATTAACCTGGCTCTTTCAGGAGATACTGAAGTCTACCGTGCCGCTAATGGTGCCAAAG
CTGCAACAGCCTTAACGAAAAACAAAGCCTTGGTGGTGCTTGTACAAACACTTGATGAGTGGTGTATCTCAA
TGTTACCATTCGTTATCGGTGGTGGTATCATGATTGCCCTTGCTTCTTGATTGACGGTGCTTGGGTATTCCAAAT
15 GAAAACTTGGCAATCTTGGTCTTACCATGAGTTAGCTTCTATGTTTATGAAAATTGGTGGAGCTGCCTTTGGTTT
GATGCTTCCAGTCTTTGCGGGTTATGTTGCCTACTCTATTGCTGAAAAACCGGGTTGGTAGCAGGTTTCGTGGCT
GGTGCTATTGCCAAAGAAGGTTTTGCCTTTGGTAAAAATCTTATGCCGAGGTGGTGAAGCACTTCAACTTTG
CAGGTGCTCATCTGGTTTCTAGGTGCCCTTGGTGGTGGTATTCGCAAGGTGCCTTGGTTTGGCTTCCATCAAGAAA
TACGTTAAAGTTCTCGTTCCTCACTCGAAGGTGCTAAATCAATCCTTCTATTGCCACTTCTTGAACAATCTTGACAG
20 GATTTGTTATGCTAGCTGTGAATATCCCAATGGCTGCAATCAACACTGCTATGAATGACTTCTAGGCGGTCTTGG
AGGAGGTTCACTGTCTTCTTGGTATCGTCTTGGTGGATGCTTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGTGGT
GCAGCTTATGCTTTGGTACAGGTACGCTTGCAGCAACTGTTTCTTCAAGGTGGTCTGTAGCCATGGCAGCAGTTA
TGGCTGGAGGAATGGTGCCACCACCTGCAATCTTGTGCGCAACTCTTCTTTCAAAGATAAATTTACTAAGGAAGA
ACGTAACCTCTGTTTGAACAACATCATATGGGCTGTGCTTTATCACTGAGGGAGCGATTCCATTGGTGCCGCT
25 GACCCAGCTCGTGGCATTCCAAGCTTCATCTTGGTGCAGAGTAGCAGGTGGACTCGTTGGTCTTACTGGTATCA
AACTCATGGCGCCACACGGAGGAATCTTCGTTATCGCCCTTACTTCAAATGCTCTCCTTACCTCGTTTCTGTCTTG
GTAGGAGCAATCGTAAGTGGTGTGGTTTATGGTTACCTACGCAAAACCACAAGCATAA

4175.6

ATGGCAACAAGAATACAAGTACAACAAGACGGAGACCGTCTAAAGCAGAACTGGAAAGAAAAGAAGCGATTCA
ACGAATGTTGATTTCGTTAGGAATTGCGATTTTATTGATTTTCGAGCCTTCAAATTAGGGGCTGCAGGTATAACC
CTTTATAATTAAATTCGCTTGCTAGTGGGTAGCCTAGCTTATCTGGCGATATTCCGCCCTATTAATCTATCTCTTCT
TTTCAAGTGGATACGAAAAACAGGAAGGACTCTTATCTGGCTTTTTACCATATTTGCTGGCTTACTCTTGATTTTTG
AGGCCTACTTGGTTTGGAAATATGGTTTGGACAAGTCCGTTCTAAAAGGGACCATGGCTCAGGTTGTGACAGATCT
35 GACTGGTTTTGCAACGACTAGCTTTGCTGGAGGGGGCTTGATCGGGGTCGCTCTTTATATTTCAAACAGCCTTTCTC
TTTTCAAATATCGGAACCTTACTTTATTGGTCTATCTTGATTTTATGGGTTCTCTCCTAGTCAGCCCTTGGTCTGTT
TACGATATTGCTGAATTTTTCAGTAGAGGCTTTGCCAAATGGTGGGAAGGGCAGAGCGTCGAAAAGAGGAACGC
TTTGTCAAACAAGAAGAAAAAGCTCGCCAAAAGGCTGAGAAAGAGGCTAGATTAGAACAAGAAGAGACTGAAAA
AGCCTTACTCGATTTCCTCTGTTGATATGGAACCGGTGAAATTTCTGACAGAGGAAGCTGTTCAAATCTTCCA
40 CCTATTCCAGAAAGAAAGTGGGTGGAACCAAGAAATCATCTGCCTCAAGCTGAACCTTAAATTCCTGAACAGGAA
GATGACTCAGATGACGAAGATGTTTCAGGTGCGATTTTTCAGCCAAAGAAGCCCTTGAATACAACTTCCAAGCTTA
CAACTCTTTGCACCAGATAAACCAAAAGATCAGTCTAAAGAGAAGAAAATTGTGAGAGAAAATATCAAAATCTTA
GAAGCAACCTTTGCTAGCTTTGGTATTAAGGTAAACAGTTTGAACGGGCCGAAATTTGGGCCATCAGTGACCAAGTAT
GAAGTCAAGCCGGCTGTTGGTGAAGGGTCAACCGCATTTCCAATCTATCAGATGACCTCGCTCTAGCCTTGGCTG
45 CCAAAGATGTCCGGATTGAAGCACCAATCCCTGGGAAATCCCTAATCGGAATTGAAGTGCCCAACTCCGATATTG
CCACTGTATCTTCCGAGAACTATGGGAACAATCGCAACGAAAGCAGAAAAATTTCTGGAATTCCTTTAGGGA
AGGCTGTTAATGGAAACCGCAAGAGCTTTGACCTTTCTAAAATGCCCACTTGCTAGTTGCAGGTTCAACGGGTTT
AGGGAAGTCAGTAGCAGTTAACGGCATTATGCTAGCATTCTCATGAAGGCGAGACCAGATCAAGTTAAATTTAT
GATGGTCGATCCCAAGATGGTTGAGTTATCTGTTTACAATGATATCCCCACCTCTTGATTCCAGTCGTGACCAAT
50 CCACGCAAGGCCAGCAAGGCTCTGCAAAAGGTTGTGGATGAAATGAAAACCGTTATGAACTCTTTGCCAAGGTG
GGAGTTCGGAATATTGCAGGTTTTAATGCCAAGGTAGAAGAGTTCAATTCAGTCTGAGTACAAGCAAATTCG
CTACCATTCTATGTCGTGATTGTGGATGAGTTGGCTGACCTCATGATGGTGGCCAGCAAGGAAGTGAAGATGCTA
TCATCCGCTCTTGGGACAGAAAGGCGCGTGTGACAGGTATCCACATGATTCTTGCAACTCAGCGTCCATCTGTTGATG
CATCTCTGGTTTGATTAAAGGCCAATGTTCCATCTCGTGTAGCATTGCGGTTTCATCAGGAACAGACTCCCGTACG
55 ATTTTGGATGAAAATGGAGCAGAAAACTTCTTGGTTCGAGGAGACATGCTCTTAAACCGATTGATGAAAATCAT
CCAGTTCGTCTCCAAGGCTCCTTATCTCGGATGACGATGTTGAGCGCATTGTGAACCTTCATCAAGACTCAGGCAG
ATGCAGACTACGATGAGAGTTTTGATCCAGGTGAGGTTTGAAGAAATGAAGGAGAAATTTCCGGATGGAGATGCTG
GTGGTATCCGCTTTTTGAAGAAGCTAAGTCTTTGGTTATCGAAACACAGAAAGCCAGTGCCTCTATGATTCAGCG
TCGTTTATCAGTTGGATTTAACCGTGCGACCCGCTCATGGAAGAACTGGAGATAGCAGGTGTATCGGTCCAGCT
60 GAAGGTACCAACCTCGAAAAGTGTTACAACAATAA

4176.1

ATGAGTTATTTAAAAAATATAAATTCGATAAATCCAGTTCAAACCTTGGTATGCGAACCTTTAAAAACAGGTATTG
CTGTTTTCTAGTTCTCTTGATTTTGGCTTTTTGGCTGGAAGGTCTTCAAATTTGGTCTTTGACAGCGTTTTTA
65 GCTTGAGGAGAGTTTTGATGAGAGTGTTCATTTGGGACTTCGCGTATTCTAGGAAATAGTATCGGTGGACTCTA
TGCTTGGTCTTCTTCTTATTAATAACCTTTTTCCACGAAGCCTTTTGGGTGACCTTGGTAGTTGTTCCAATCTGCA

CCATGTTAACCATTATGACAAATGTAGCCATGAATAACAAAGCAGGGGTTATTGGTGGTGTAGCAGCTATGTTAAAT
CATTACCCTATCAATTCCAAGTGGTGAGACAATTTTGTACGTGTTTGTGCGTGTATTAGAAAACGTTTATGGGAGTT
TTTGTGCAATTATCGTAAATTACGATATTGATCGTATTCTCTCTTTTATAGAAAAAAGAAAAATAA

5

4178.2

ATGAATAAATCAGAACACCGCCACCAACTTATACGCGCTCTTATCACAACAAAAACAAGATTCATACACAGGCTGAG
TTGCAAGCCCTTCTTGTGAGAACGACATTCAAGTAACCCAGGCAACCCTCTCACGCGACATCAAAAATATGAAC
CTATCAAAAGTCCGCGAAGAAGATAGCGCTTATTATGTTCTTAACAATGGTTCCATCTCAAAATGGGAAAAACGTC
TCGAACTTCACATTGGGAAGACGCCCTTGTCTGGATGCGCCAGTTCAACACCAAGTCCTACTAAAAACCTTCCCTGG
ACTGGCTCAATCCTTTGGTTCTATCATTGATCTTTGAGCTTCCCTGACGCTATCGCTACCTTTTGTGGTAATGATG
TCTGTCTTATCATCTGTGAAGATGCAGATACTGCTCAAAAGTGCTTTGAAGAACTGAAAAAATTCGCCCCACCATT
TTTCTTTGAAGAATAA

10

4179.1

ATGAAAAAGTATAAAATTAAATGCTCTATCTTACATGGGAATTCGTGTCTTGAATATTATTTTCCCATCCTAACTGG
AACCTATGTCGCGCGTGTCTTGGACCGAACTGACTATGGTTACTTCAACTCAGTCGACACTATTTTGTCAATTTTCT
TGCCCTTTGCAACTTATGGTGTCTATAACTACGGTTTAAAGGCTATCAGTAATGTCAAGGATAACAAAAAAGATCT
TAACAGAACCTTTTCTAGTCTTTTATTTGTGCATCGCTGTACGATTTTGACCACTGCTGTCTATATCCTAGCCT
ATCCTCTCTTTTACTGATAATCCAATCGTCAAAAAGGTTACCTTGTATGGGGATTCAACTCATTGCCAGATT
TTTTCAATCGAATGGGTCAATGAAGCTCGGAAAATTACAGTTTCTCTTTACAAAACCTTCATCCGTATCCT
GATGCTGGTCTCTATTTTCTTATTTGTTAAAAATGAACACGATATTGTTGTCTATACACTTGTGATGAGTTTATCGA
CGCTGATTAACCTACCTGATTAGTTATTTTGGATTAAAAGAGACATCAAACTTGTAAAAATTCACCTAAGTGATTT
TAAACCACTCTTTTCCCTCTGACAGCCATGTTAGTCTTTGCCAATGCCAATATGCTCTTCACTTTTGTAGATCGCC
TCTTCCCTCGTTAAACACGGGATTGATGTAACGTTAGTTACTATACCATAGCTCAGCGAATTGTGACCGTTATAGC
TGGGGTTGTAACAGGTGCAATTGGAGTGAGTGTGCCTCGTCTCAGTTACTATCTGGGGAAAGGAGACAAAGAAGC
CTATGTTTCTCTGGTTAATAGAGGTAGTCAATCTTTAACTTCTTTATCATTCCACTGAGTTTGGACTCATGGTTT
TAGGACCAAAATGCCATCCTACTTTACGGTAGTGAAAAATATATCGGAGGCGGCATCTTGACCTCTCTCTCGCTTT
TCGTACGATTATCCTGGCCTTAGATACCACTTCTGGTTCCCAAATTCCTTTACCAATGGCTATGAAAAACGTATC
ACAGTCTATACAGTCTTTGCTGGGCTACTCAATTTGGGCTTGAATAGTCTCCTTTTTTCAACCATATCGTGGCTCC
TGAATACTACTTACTGACAATATGCTATCAGAGACTTCTCTACITGTTTTCTATATCATTTCATCCATAGAAAAAC
AACTCATCCACTTGGGACATATCTTAGCTATACGTTCGATACCTCTCTCTTTTCACTTTCTTTGTAGCAATTTATT
TCCTGATTAATTTCTGTATCTCTGTAGATATGGTCATTAATTTGCCATTTTGTATTA
ATACTGGTTTGTATGTCTTGTATCAGCTATCTCTTATATTAGTCTACTTGTCTTCACAAAAGATAGCATTTCAT
GAATTTTAAACCATGTCCTAGCCTTAAAAAATAAATTTAAAAAATCATAG

35

4179.2

ATGAAAAACAATAACCGTTGAAGATGCCAAACAAATTGAATTAGAAAATTTGGATTATATTGATACTCTCTGTAAAA
AGCAAAATATCAACTATATTAACTACGGTACTCTGATTGGGGCGGTCGACATGAGGGCTTATCCCTTGGGA
CGACGATATTGATCTGTCCATGCCTAGAGAAGACTACCAACGATTTTAAACATTTTCAAAGGAAAAAAGCAA
GTATAAGCTCCTATCCTTAGAACTGATAAGAACTACTTTAACAACCTTATCAAGATAACCGACAGTACGACTAAA
ATTATTGATACTCGAAATACAAAAACCTATGAGTCTGGTATCTTTATCGATATTTTCCCTATAGATCGCTTTGATGA
TCCTAAGGTCACTGATACTTGTATAACTGGAAGAGTCAAACTGCTGTCTTTTCACTAAGCAATAAAAAATATTGTC
TATAAGGATAGCCTTTTAAAGATTGGATACGAACAGCCTTCTGGTTACTCCTTCGACCGGTTTCTCCTCGTTATTT
TGCAAAATAAAATCGAGAAAGAAATTCAAAAATATAGTCGTGAAAAATGGGCAATATATGGCTTTTATCCCTTCAAA
ATTTAAGGAAAAGGAAGTCTTCCCAAGTGGTACCTTTGATAAAACAATCGATTACCTTTTGAAGATTTAAGCCTT
CCTGCACCTGAAAAATTTGATACTATTTTGACACAATTTTATGGAGATTATATGACCTACCACCAGAAGAAAAAC
GCTTCTACAGTCATGAATTTACGCTTATAAATTGGAGGATTAG

45

4179.3

ATGATAAAAAATCAATCATCTAACCATCACACAAAAACAAGATTTACGAGATCTTGTATCTGACCTAACCATGACC
ATCCAAGACGGGGAAAAAGGTTGCTATTATTGGTGAAGAAGGAAATGGCAAAATCAACCTTACTTAAAAATTTAATG
GGGGAAGCTTTGTCTGATTTCACTATCAAGGGAACATCCAATCTGACTATCAGTCACTGGCCTACATTCCTCAAA
AAGTCCCTGAGGACCTAAAAAAGAAAACTTTACACGACTACTTCTTTTATAGATTCTATTGATTAGACTACAGTAT
CCTCTATCGTTTGGCGGAGGAATTGCATTTTGATAGCAATCGTTTCGCAAGTGACCAAGAGATTGGCAATCTATCA
GGGGGCGAAGCTTTGAAAAATTCAGCTTATCCATGAGTTAGCCAAACCTTTGAGATTCTATTTTATGATGAACCTT
CAAAATGACCTTGAGACAGTTGATTGGCTAAAAGGCCAGATTCAAAAGACCAGGCAAAACCGTTATTTTCA
TTTCCCATGATGAAGACTTTTCTTCTGAAACCGGCAGACACTATTGTTCACTTGCAGCTGGTCAAAACACCGTAAAGA
AGCGGAAACGCTAGTAGAGCATTTAGACTATGATAGCTATAGTGAGCAGAGAAAGGCTAAATTTGCCAAACAAAG
TCAGCAAGCTGTCTAACACCAAGAGCCTACGATAAAAACCATGGAAAAACATCGGAGAGTTAAGCAAAATGTAG
AAACTGCGCTTCGAGCTACCAAGATAGTACTGCCGTCGCTATTGGCTAAAAAAGATGAAAAAAGTCCCTCTCAC
AAGAAAAACGCTACGAAAAGGCAGCTCAGTCCATGACTCAAAAGCCACTTGAAGAGGAACAAATCCAACCTTTTCT
TTTCAGACATCCAACCAATTACCAGCTTCTAAAGTCTTAGTCCAACCTGGAAAAAAGAAAAATTTGTCCATTGACGACCG
AGTTTGGTTCAAAAACTACAATACTGTCGGTGGCCAAAGAAAAAATCGGTATTATCGG
GCCAAATGGTGTGGGAAATCAACTCTGTAGCCAAGTTACAGAGACTTCTGAATGATAAAAGAGAGATTTCACT
TGGTTTTATGCCACAAGATTACCACAAAAAATGCAATTTGGATTTATCCCAATAGCCTATCTCAGTAAACTGGG

55

60

65

5 GAAAAAGAGGAACTACAGAAAATCCAATCTCACCTAGCTAGTCTCAATTTAGTTATCCAGAAATGCAGCATCAA
ATTCGCTCCTTATCTGGCGGACAACAGGGAAAACTCTGCTTTTGGATTTAGTCCTGCGCAAACTTTCTCC
TGCTGGATGAACCCACACGAAACTTTTCTCCCACTTCTCAACCCCAAATCAGAAAATCTTTGCTACCTATCCAGG
CGGTCTCATCACTGTTTCGCATGACCGTCGTTTCTTAAAAGAGTCTGCTCGATCATCTATCGCATGACAGAACAC
GGTTTGAAGCTAGTTAATTTAGAAGATTTATAA

4179.4

10 ATGAAACCAAAAAACATTTTACAACTTGCTTGCCGAGCAGAATCTTCCACTTTCCGACCAGCAAAAAAGAACAATTT
GAACGTTATTTTGAGCTCTTGGTCGAGTGGAATGAGAAGATTAATTTGACGGCGATTACGGACAAGGAAGAAGTT
TATCTCAAACATTTTACGATTTCGATTGCACCCATTCTTCAAGGTTTGATTCCCAATGAAACTATCAAACCTTCTTGA
TATCGGGGCTGGGGCAGGATTTCTAGTCTACCAATGAAAATTCTCTATCCGGAGTTAGATGTGACCATTATTGAT
TCACTCAATAAGCGCATCAACTTCTACAACCTTTGGCTCAAGAACTGGATTTGAACGGAGTTTCAATTCTACCACG
GACGTGCCGAAGATTTTGCCCAAGACAAGAACTTCCGTGCTCAATATGATTTTGTAACAGCTCGTGCGGTTGCCCG
15 TATGCAGGTCTATCTGAATTGACTATTCCCTACCTTAAAGTTTGGTGGCAAACTATTAGCACTCAAGGCTAGCAAT
GCGCCTGAGGAATTATTAGAAGCTAAGAATGCCCTCAATCTCCTTTTAGTAAGGTGCAAGACAATCTCAGGtACG
CCCTACCGAATAGAGATCCGCGCTATATCACAGTGGTAGAAAAAGAAAAAGAAACACCAATAAATATCCACGTA
AGGCTGGTATGCCAAATAAACGCCCACTTTAA

4179.6

20 ATGAGTATTAATACTAATTGCCGTTGATATCGACGGAACCCCTTGTCACACAGCCAAAAGGAAATCACTCCTGAAGTTT
TTTCTGCCATCCAAGATGCCAAAGAAGCTGGTGTCAAAGTCGTGATTGCAACTGGCCGCCCTATCGCAGGCGTTGC
CAAACCTTCTAGACGACTTGCAGTTGAGAGACGAGGGGGACTATGTGGTAACCTTCAACGGTGCCCTTGTCCAAGA
AACTGCTACAGGACATGAGATTATCAGCGAATCCTTGACTTATGAGGATTATCTAGATATGGAATTTCTCAGTCGC
AAGCTCGGTGTCCACATGCATGCCATTACAAGGACGGTATCTATACTGCAAAATCGCAATTCGGAATAACATACAT
25 GTACACGAATCAACCCCTCGTCAGCATGCCTATCTTCTACCGTACCCCTGAAGAAATGGCTGGCAAGAAATTTGTTA
AATGTATGTTTATCGATGAACCAGAAATCTCGATGCTGCGATTGAAAAAATTCAGCAGAAATTTTACGAGCGCTA
CTCCATCAACAAATCTGCTCCTTTCTACCTCGAACTCCTTAAAAAGAAATGTAGACAAGGGTTCAGCCATTACTCAC
TTGGCTGAAAAAATCGGATTGACCAAAAGATGAAACCATGGCAATCGGTGATGAAGAAAATGACCGTGCCATGCTG
30 GAAGTCGTTGAAAACCCCGTTGTCATGGAAAATGGAATCCAGAAATCAAAAAATCGCCAAATACATACCAAAA
ACAAATGACGAATCCGGCGTTGCCATGCCATCCGAACATGGGTACTGTAA

4179.7

35 ATGACTTGGATTATTCTTGGAGTTATCGCTCTTATTGTTATTTTGTGATTGTTAGCTATAACGGTTTGGTTAAAAA
TCGTATGCAAAACCAAGGAGGCTTGGAGTCAGATTGATGTTTCAAGTCGCAATGACCTCTTGCCAAACTTG
ATTGAGACTGTAAAAGGTTATGCCAAATATGAAGGTTCTACCCCTGAAAAGGTGGCAGAACTACGTAACCAAGTG
GCGGCAGCGACTTCACCAGCAGAAGCTATGAAAGCCAGTGATGCCCTCACTCGTCAGGTTTTCAGGTATTTTTCGAC
TTGCAGAAAGCTATCCAGATTGAAAGCTAGTGCTAACTTTGTTAAATTGCAAGAGGAGTTGACAAACACAGAAA
ATAAAATTTCTTACTCTCGTCAACTCTATAACAGTGTTGTCAGCAACTACAATGTAATAATAGAACTTTCCCGAG
40 CAATATTATCGCTGGAATGTTTGGATTTAAAGCGGCAGATTTCCTTCAAACACCTGAAGAGGAAAAGTCGGTTCTT
AAAGTTGATTTTAGCGGTTTAGGTGACTAA

4179.8

45 ATGTTGTTTGATCAAATTGCAAGCAATAAACGAAAAACCTGGATTTTGTGCTGGTATTTTCTACTCTTAGCTCT
TGTTGGTTATGCGGTTGGTTATCTCTTTATAAGATCTGGACTTGGTGGTTTGGTTATTGCACTGATTATCGGCTTTA
TCTACGCTTTGTCTATGATTTTCAATCGACAGAGATTGTCATGTCCATGAATGGAGCGCGTGAGGTGGATGAGCA
AACGGCACCAAGCCTCTACCATGTAGTGAAGATATGGCTCTGGTCGCTCAGATTCCATGACCCCGTGTTCATC
ATTGATGATCCAGCCTTAAATGCCTTTGCGACAGGTTCTAATCCTCAAAATGCGGCTGTTGCTGCGACTTCAGGTC
TACTAGCTATCATGAATCGTGAAGAACTAGAAGCTGTTATGGGACATGAAGTCAGTCATATTCGTAATTATGATAT
50 CCGTATTTGCACTATTGCAGTTGCCCTTGCTAGTGCTATCACCATGCTTTCTAGTATGGCAGTCTGATGATGTTG
GGGGTGAGCAGGTGCGCAGACGAAGTGATGATGACCGAGATGGAAATGGTCTTGAAATCATTATGCTAGTGGTTT
CCCTACTAGCTATTGTACTGGCACCTCTCGCTGCAACCTTGTTTTCAGCTCGCTATTTCTCGTCAGAGGGAATTTCTG
GCAGATGCATCTAGTGTCGAGCTGACTCGCAATCCCCAGGGAATGATTAATGCCCTAGATAAGTTGGACAATAGC
AAACCTATGAGTCGCCACGTCGATGATGCTAGCAGTGCCCTTTATATCAATGATCCTAAGAAAGGTGGGGGGTTT
55 CAAAACTCTTTTATACCCACCCACCTATCTCAGAACGGATTGAACGTTTAAACAGATGTAA

4179.9

60 ATGAAATTAAATATTCAAGAAAATTCGTAAGCAGTCTGAAGGTTTGAACCTTTGAACAAAACGTTAGATTTAGTTGATG
ACCTGCGTGACGTAATCAAGAAAATTTAGATGTAAGAGATATCCTTGACAGTTGGGAAAGTACAATATGAAGACC
GTATGATTTTCTTAGATTATCAACTATCTTATACCAATTGTTCTTGCTTCGAGTCGAGTATGGAGCCAGTTGAGTTA
GTTGAATCTTATAGTACGTCACGGAAGTTTTCATGGAAGGCGCAACTAACAGCTAGATCAAGAAAGTTTATAGATGATG
ACTTGGTCTTGCCATCGAAAAATGGGGAGCTTGACCTTGCTGAGAGTGATCAGACAATATCCTGCTAAACATTCC
TATCAAGGCTTGACGGCTGAAGAAGAAGCTGGTCAAGGATTTATCTCAGGAAATGACTGGCAATCATGACAGA
65 GGAAGAATACCAAGCTCAAAAAGCAGTAAAGAAAGAAGAAAAACAGTCTTTTGTGGCTTACAAGGACTATTTGA
CGGAGATGAATAA

4179.12

ATGGAGTTATTTATGAAAAATCACAACTATGAAATCTATAAGTTAAAAAAATCAGGTTTGACCAATCAACAGATTT
TGAAAGTGCTAGAAATACGGTGAAAAATGTTGATCAGGAGCTTTTGTGGGTGATATTGCAGATATCTCAGTTGCCG
TAATCCAGCCGTTTTTATGGAACGTTATTTTCAGATAGACGATGCGCATTGTGCGAAAGAGTTTCAAAAATTTCCA
TCTTTCTCTATTTAGATGACTGTTATCCTTGGGATTTGAGTGAAATATATGATGCGCCTGTACTTTTATTTTACAA
GGGAAATCTTGACCTCCTGAAATTTCCCGAAGGTAGCGGTCTGGGTCAGTCGTGCTGTAGCAAAACAGGGAGCTAA
GTCAGTTGAAAAAGTCATTCAAGGCTTGGAAAAATGAACTGGTTATTGTCAAGTGGTCTGGCCAAGGGCATTGACAC
AGCAGCTCATATGGCAGCTCTTCAGAATGGCGGAAAAAACATTGCAGTGATTGGAACAGGACTGGATGTGTTTTA
TCCTAAAGCCAATAAACGCTTGCAAGACTACATCGGCAATGACCATCTGGTTCTAAGTGAATATGGACCTGGTGA
ACAACCTCTGAAATTTCAATTTTCTGCCGTAATCGCATCATTGCTGGACTTTGTCTGGTGTGATTGTAGCAGAG
GCTAAGATGCGTTTCAGGTAGTCTCATTACGTGTGAGCGAGCAATGGAGAAGGACGCGATGTCTTTGCTATTCCTG
GTAGCATTTTAGATGGACTATCAGACGGTTGCCATCATTGATTCAAGAAGGAGCAAAATTTGGTCACCAAGTGGGC
AAGATGTTCTTGCGGAATTTGAATTTTAA

4181.1

ATGAAACGTC AATTAGCCTTGGTCTCTT TAGTGGTGGTCAAGATTCAACAACCTGCCTTTTCTGGGTCAATGCAAC
ACTATGAAACAGTCGAAGCTGTACCTTTTGCCTACGGCCAACGTCATCACCTCGAAATTC A AATTACTAGAGAAAT
CGCTAAGGAACAGGGCATTTCGTACCATATCCTCGATATGTCTCTGCTGGGACAAATCACTGCTCAGCCAGACTTT
GCGACGATTCATATTTCTACATTCTGACAAGCTCTGTGTCGAGTCAAAATCCCTCAAATCTATCTATTTAGCT
ACCGAAACACCGGAGATTTCCACGAAAACCTGTATCAACACCATCGGGAAGACTTGGTCAACTGTCTAGACCCTC
GCTATTTAGAAGTCTGGGGAAAAATTCCTCCGCGCGGTGGCATTTC AATCGACCCCTACTACAACCTACGGTAAGCA
AGGAACTAAGTATGAGGGCTTGCGAGAACAACGCCTCTTCCAACACGACCTTTATCCAGAGAAAAATTGACAACCG
CTAA

4181.2

ATGACCGAAACGGT AGAAGATAAAGTAAGTCATTCAATTACTGGGCTTGATATCCTCAAGGGGATAGTTGCTGCG
GGAGCTGTCTAAGTGGAACCGTTGCAACTCAAACGAAGGTATTTACAAATGAGTCAGCAGTACTTGAAAAAACT
GTAGAGAAAAACGGATGCTTTGGCAACAAATGATACAGTAGTTCTAGGTACGATATCTACAAGTAATTCAGCGAGT
TCAACTAGTTTGTCAGCTTCAGAGTCGGCAAGTACATCTGCATCTGAGTCAGCCTCAACCAGCGCTTCGACCTCAG
CAAGTACAAGTGCATCAGAATCAGCAAGTACATCGGCTTCGACAAGTATTTCTGCATCTACTGTGATAGGTTT
ACAAACAGCTGCCGCTACAGAAGCAACTGCTAAGAAAGGTGGAAGAGATCGTAAGAAACCAAGCTAGTGATTATGT
AGCATCAGTTACAAATGTCAATCTCCAATCTTATGCTAAGCGACGCAAGCGTTTCAGTGGATTCCATCGAGCAATTG
CTGGCTTCTATAAAAAATGCTGCTGTTTTTTCTGGCAATACGATTGTAATGGCGCCCCCTGCAATTAATGCAAGTC
TAAACATTGCTAAAAAGTGAGACAAAAGTTTATACAGGTGAGGTGTAGATTTCGGTATATCGTGTTC AATTACTA
TAAATTGAAAAGTGACAAATGATGGTTCAAAATTTGACCTTTACCTATACGGTTACGTATGTGAATCTTAAAAACAAT
GATCTTGGTAATATATCAAGTATGCGTCTCGGATATTCTATCTATAATTCAGGTACTTCAACACAAAACAATGTTAA
CCCTTGGCAGTGATCTTGGTAAACCTTCAGGTGTAAAGAACTACATTACTGACAAAAATGGTAGACAGGTTCTATC
CTATAATACATCTACAAATGACGACGAGGTAGTGGGTATACCTTGGGGAAATGGTGCCCAAAATGAATGGTTTCTTT
GCTAAGAAAGGATATGGATTAACATCATCTTGGACTGTACCAATTACTGGAACGGA
TACATCTTTACATTTACCCCTTACGCTGCTAGAACAGATAGAATTGGAATTA AACTACTTCAATGGTGGAGGAAAG
GTAGTTGAATCTAGCACGACCAAGTCAGTCACTTTACAGTCTAAGTCACTCTCAGTAAGTGCTAGTCAAAGCGCCT
CAGCTTCAGCATCAACAAGTGCGTTCAGCATCAACAGTGCCTCGGCTTCAGCGTCAACCAGTGCGTCAG
CTTCAGCAAGTACCAGTGCTTCAGTCTCAGCATCAACAAGTGCTTCAGCCTCAGCATCGACAAGTGCCTCGGCTTC
AGCAAGCACATCAGCATCTGAATCAGCGTCAACCAGTGCTTCGGCTTCAGCAAGTACCAGTGCTTCAGCTTCAGC
ATCAACAGCGCCTCGGCTTCAGCAAGCACCTCAGCTTCTGAATCGGCCTCAACCAGCGCCTCGGCTTCAGCAAG
CACCTCAGCTTCTGAATCGGCCTCAACCAGCGCCTCAGCCTCAGCATCAACGAGTGCTTCGGCTTCAGCAAGCAC
AAGCGCCTCGGCTTCAGCATCAACGAGTACGTACGCTTCAGCGTCAACCAGTGCTTCAGCCTCAGCATCAACAAG
TGCGTCAGCCTCAGCAAGTATCTCAGCGTCTGAATCGGCATCAACGAGTGCGTCTGAGTCAGCATCAACGAGTAC
GTCAGCCTCAGCAAGCACCTCAGCTTCTGAATCGGCCTCAACCAGTGCGTTCAGCCTCAGCATCGACAAGCGCCTC
AGCTTCAGCAAGTACCAGTGCTTCAGCCTCAGCGTCGACAAGTGCGTTCGGCTTCAGCAAGTGCATCTGAATCGGC
ATCAACAGTGCGTTCAGCCTCAGCAAGTACTAGTGATCGGCTTCAGCATCAACCAGTGCTTCGGCTTCAGCGTCA
ACCAGTTCGCTCAGCTTCAGCAAGTACCAGTGCTTCAGCTTCAGCATCAACAAGTGCTTCAGCCTCAGCATCGACA
AGTGCTTCGGCTTCAGCAAGCACATCAGCATCTGAATCAGCGTCGACAAGCGCCTCAGCTTCAGCAAGTACCAGT
GCGTCAGCTTCAGCATCAACCAGCGCCTCGGCTTCAGCAAGCACCTCAGCTTCTGAATCGGCCTCAACCAGCGCC
TCGGCTTCAGCAAGCACCTCAGCTTCTGAATCGGCCTCAACCAGCGCCTCAGCCTCAGCATCAACGAGTGCTTCG
GCTTCAGCAAGCAACAGCGCCTCGGCTTCAGCATCAACGAGTACGTACGCTTCAGCGTCAACCAGTGCTTCAGGC
TCAGCATCAACAAGTGCGTTCAGCCTCAGCAAGTATCTCAGCGTCTGAATCGGCATCAACGAGTGCGTCTGAGTCA
GCATCAACGAGTACGTACGCTTCAGCAAGCACCTCAGCTTCTGAATCGGCCTCAACCAGTGCGTTCAGCCTCAGCA
TCGACAAGCGCCTCAGCTTCAGCAAGTACCAGTGCTTCAGCCTCAGCTCGACAAGTGCGTTCGGCTTC AACCAGTG
CATCTGAATCGGCTTCAGCCTCAGCCTCAGCAAGTACTAGTGATCAGCTTCAGCATCAACGAGTGCTTCAGCAT
CGGCTTCAGCATCAACCAGTGCTTCGGCTTCAGCGTCAACCAGTGCGTTCAGCTTCAGCAAGTACCAGTGCTTCAGT
CTCAGCATCAACAAGTGCTTCAGCCTCAGCATCGACAAGTGCTTCGGCTTCAGCAAGCACATCAGCATCTGAATCA
CGCTCGACAAGCGCTCAGCTTCAGCAAGTACCAGTGCTTCAGCGTTCAGCCTCAGCGTCGACAAGTGCGTTCAGCAT
AGTACTAGTGATCAGCTTCAGCATCAACGAGTGCTTCGGCTTCGGCGTCAACCAGTGCTTCAGAGTCAAGT
ACCAGTGCTTCAGCTTCGCTCAACAAGTGCTTCGGCTTCAGCAAGCACCAAGTGCTTCGGCTTCAGCAAGTACT

AGCGCCTCAGCCTCAGCCTCAACCAGTGCGTCAGCCTCAGCAAGTATCTCAGCGTCTGAATCGGCATCAACGAGT
GCGTCCGCTTCAGCAAGTACTAGCGCCTCAGCCTCAGCGTCAACAAGTGCAATCGGCTTCAGCGTCAACGAGTGCG
TCTGAATCGGCATCAACGAGTGCGTCCGCTTCAGCAAGTACTAGCGCCTCAGCCTCAGCGTCAACAAGTGCAATCG
5 GCTTCAGCATCAACGAGTGCGTCCGCTTCAGCAAGTACTAGCGCCTCAGCCTCAGCGTCAACAAGTGCAATCG
CAGCGTCAACGAGTGCGTCTGAGTCAGCATCAACGAGTGCGTCAGCCTCAGCAAGCACATCAGCTTCTGAATCTG
CATCAACCAGTGCGTCAGCCTCAGCATCGACAAGCGCCTCAGCTTCAGCAAGTACCAGTGCGTCAGCCTCAGCGT
CGACAAGTGCGTCCGCTTCAGCAAGTACCAGTGCGTCAGCCTCAGCAAGTACCAGTGCGTCAGCCTCAGCGTCGA
10 CAAGTGCGTCCGCTCAACCAGTGCAATCTGAATCGGCATCAACCAGTGCGTCAGCCTCAGCAAGTACTAGTGCA
CAGCTTCAGCATCAACGAGTGCAATCGGCTTCAGCATCAACCAGTGCAATCAGAGTCAGCAAGTACCAGTGCGTCAG
TTCCGCATCAACAAGTGCGCTCGGCTTCAGCAAGTACTAG

4183.1

ATGGGGGTCGAACTTGGTTTTATTCTAGCATCTGCTGGCTGGCCATCGGGCTTGGTTCCGTTTGGAAAGTTCCCT
ACATGACTGCTGCTAATGGCGGTGGAGGCTTTTTACTAATCTTTCTATTTCCACTATTTAATCGGTTTCCCTCTC
15 CTGCTGGCTGAGTTTGGCCTTGGCCGATAGTGCTGGCGTTTCCGCTATCAAAACCTTTGGAAAACTGGGCAAGAATA
ACAAGTACAACCTTTATCGGTTGGATTGGCGCCTTTGCCCTCTTTATCCTCTTATCTTTTACAGTGTTATCGGAGGA
TGGATTCTAGTCTATCTAGGTATTGAGTTTGGGAAATTGTTCCAACTTGGTGGAAACGGGTGATTATGCTCAGTTAT
TTACTTCAATCATTTCAAATCCAGCCATTGCCCTAGGAGCTCAAGCGGCCTTTATCCTATTGAATATCTTCATTGTA
20 TCACGTGGGGTTCAAAAAGGGATTGAAAGAGCTTCGAAAGTCATGATGCCCTGCTCTTTATCGTCTTTGTTTTTA
TCATCGGTGCTCTCTCAGTTTGGCAAATGCCATGGAAGGGTTCTTTACTTCTCAAACCAGACTTTTCAAACCT
GACTAGCACTGGTCTCCTCTATGCTCTGGGACAACTTTTCTTTGCCCTCTCACTAGGGGTTACAGTCATGTTGACCT
ATGCTTCTTACTTAGACAAGAAAACCAATCTAGTCCAGTCAGGAATCTCCATCGTAGCCATGAATATCTCGATATC
CATCATGGCAGGTCTAGCCATTTTCAAAGCTCGATCCCCCTTCAATATCCAGTCTGAAGGGGGACCCAGCCTGCTC
25 TTTATCGTCTTGCCTCAACTCTTTGACAAGATGCTTTTGGAAACCAATTTCTACGTCCTCTTCTCTTGTCTTCTCT
TTTGGACAGTCACCTTTTCTGTCTGATGCTGGAAATCAATGTAGACAATATCACCACCCAGGATAACAGCAAA
GTGCCAAATGGAGTGTTATTTTAGGAATTTTACCTTTGTCTTTGGCATTCTTCAGCCCTATCTTACGGTGTCATG
GCGGATGTTACATTTTGGTAAGACCTTCTTTGACGCTATGGACTTCTTGGTTTCCAATCTCCTCATGCCATTGG
30 AGCTCTCTACCTTTCACTTTTACAGGCTATATCTTTAAAAAAGGCTCTTGAATGGAGGAACCTCATCTCGATGAA
AGAGCATGGAACAAGGACTGTTCCAAGTCTGGCTCTTCTTCTTCTCGTTTCTTCTGTTTCGTCATTCCAATCATCATC
ATTGTGGTCTTATTGCCCAATTTATGTAATCAAAAAGGACTTGAGTAG

4183.5

ATGTTGAAAAAATGGCAGTTAAAGATGTTATCTTGCTTGCTTTCTTGTCTATCTTTTTTGGTGGGGTTTTCGTTGG
TTCAGGATATGTGTATAATATTCTCAGTCTACTCTTAACACCTCTTGGTTTGCAGGCCTTTGCCAATGAAATCCTCT
35 TCGGTCTCTGGTGATGGCTGCGCCCATTTGCTGCCATCTTTGTTCCGAGAGTCGGAAGTCGAACGATTGGAGAAAT
GCTAGCTGCGCTTGCTGAAGTCTTTATGGTAGCCAATTTGGTCTAGGAGCTCTTTGTCTGGCTTTGTTCAAGGTT
TGGGAAGTGAATTTGGTTTTATCGTAACATAAGAAATCGCTATGAAAGTTGGCTCTCTCTAACTGCTAATAGTATTGG
GATTACGCTTGTAGCTTTGTCTATGAATACATTAAGTTAGGTTACTACGCCTTTCCCTTCCGTTTGTCTTCCCT
40 GCTTGTGGTACGTTTTATTTCTGTTTATTTCTTCTGTACCATCTTGGTTCTGTCGCAATGTCAAACCTATCATCAGTT
TGCAACTGGAGGAAAAAGCATAG

4183.6

ATGGTCAAAGTAGCAACCCAGACACCGATTATCAGTCTCTTCTTGCTGATTTTATCCTTGGAAACATCTTTCATTCC
TTCGATTGCTCTGACTCTTTCGGTAGTCGCATTTTGTATTCTCTTTATGCTCTATTACCGTCGATTTAAAAATGTTAG
45 CTTGGATGATCATACTTGCCATTTTACCATCTTTGCCAACTACTGGGCAGTTCAGTTACACGGAGATGCTTCACA
GGCAGTCATGCTTGGAAACGAGGGCCTTTGTGACAGTTTGTATCGGCCTTGTCTTTGTTTCTCTGTTTCACTAAAAG
AGCTTCTCTGTACTTGGCTCAAAAGGGGCTATCAGCTCTTGGTCTATGCCTTGATTGTGGTATTCAATTCTTTT
CCTCTCATTACAGCAAGAAATCAAGTCCCTCAAAGAAGCTTGCCTATTACGTGGTCAAGAACTACATTTTGGTTCG
50 CCTTGATTTACAGTAAGGTTCTGATGACAGTCTTATAGTGGCGCCATCTTTACCTGAGAGCTCTATCTGCTCACGG
ATATGACGAACATGCACAGTTGAAGAATAGCTATCGGACTTTTTATATTCTAAAAAACAATAATCTACCTG
CTTTTCTTTTTATTGCTTCAAACCAGTCTATTTTATAA

4183.7

ATGAGAAAGCACCAATTACAAGTTCACAAATTAACCATTTTATCTATGATGATTGCCCTTGATGTAGTCCTTACAC
CTATCTTTTCGAATTGAGGGAATGGCACCGATGTCCAGTGATGCAATATTCTAGCAGGAATCATGATGGGACCTGT
55 TTATGCCCTGGCTATGGCTACAGTCACAGCCTTTATCCGTATGACGACTCAAGGGATTCCGCTTTAGCTCTCACA
GGAGCGACTTTTGGAGCCCTTCTAGCAGGTCTCTTTATAAGTACGGTCGAAAAATTTCACTATTCTGCTCTAGGAG
AGATTTTGGGAACAGGTATTATTGGTTCCATTGTTTCTATCTGTTATGGTACTCTTTACAGGATCAGCTGCTAAG
60 CTTAGCTGGTTTATCTACACGCTCGATTTTTCGGAGCAACCTTGATTGGTACAGCGATTTCTTTATTGCTTTTCG
ATTTTTAATCAAGCAGGAATTTTAAAAAAGTGACGGGATATTTCTTAGTGAAAGGATAGACTGA

4183.8

ATGCAGGAATTTACAAATCCCTTTCTATAGGCTCTAGTTCCTCATTTCACTGCATTACCAATGAGATTTCTTGTA
GATGCTGGCAAATGGGATTTTGGCTCTGGGATGCAAACCTGTCTATGGCAGATGATTCCCGTGAAGTTCTTGATTTT
65 ACTAAGCAAAGTCAGGCTCTCTTCATCAATTTGGGGCATTTGTCAGCTGAGAAGGAAAAAGCAATCCGCATGGCA

GCTTCGTATGCAAACCAATCTTCTCTCCCGATGGTAGTAGATGCGGTTGGCGTAACGACTTCATCCATTTCGTAAGA
GCTTAGTTAAAGACCTTTTAGACTATAGACCTACGGTCCTTAAAGGAAACATGTGAGAAATTCGAAAGTCTTGTGG
ATTAAGCACCACGGCGTTGGGGTCGATGCGAGTGCTAAAGATCAAGAAACGGAGGATTTGCTTCAAGTCTTGAA
AGACTGGTGTGACACCTATCCTGGTATGTCTTTCTTAGTCACAGGTCCCAAGGACCTCGTCGTTTCGAAAAATCAG
5 GTCGCTGTACTGGGAAATGGCTGTACTGAATTAGACTGGATAACAGGGACAGGAGACTTGGTTGGAGCCTTAACA
GCTGTTTTTCTCAGCCAAGGAAAGACTGGTTTTGAAGCTTCTTGCTTAGCAGTCTCTTATCTCAATATCGCTGCTGA
GAAAATAGTTGTTCAAGGAATGGGATTGGAAGAATTCGTTACCAAGTACTCAATCAGCTTTCGCTCCTAAGAAG
AGATGAAAATTGGCTAGATACCATCAAAGGAGAGGTTTTATGAATAG

4185.3

ATGAACCATAAAATCGCAATTTTATCAGATGTTTCATGGCAATGCGACGGCGCTAGAAGCAGTGATTGCAGATGCT
AAAAATCAAGGGGCCAGTGAATATTGGCTTCTGGGAGATATTTTTCTTCTGCTCCAGGCGCAAATGACTTAGTCG
CCCTGCTAAAGGACCTTCTATCAGCAAGTTCGAGGCAATTGGGATGATCGTGTCTTGAGGCTTTAGATGG
15 GCAATATGGCTTAGAAGACCCACAGGAAGTTAGCTTTCGCTATGACACAGTATTTGATGGAGCGAATGGATCC
TGCAACGATTGTCTGGCTACGAAGCTTGCCTTTCGCTGGAAAAGAAAGAAATTGACGGATTGCGCTTTTCTATCTCT
CATAATTTACCTGACAAAACTATGGTGGTGACTTGCTAGTTGAGAATGATACAGAGAAATTTGACCAACTGCTA
20 GATGCGGAAACGGACGTGGCAGTTTTATGGTCATGTTCAAGCAGTTGCTTCGTTATGGAAGTCAAGGGCAACAA
ATCATCAATCCAGGGTCGATTGGCATGCCCTATTTAATTGGGAGGCGTTAAAAAATCACCGTTCCAGTATGCCG
TGATAGAAGTTGAAGATGGGGAATTACTCAATATCCAATTTTCGTAAGTTGCTTATGATTACGAAGCTGAGTTAGA
ATTGGCCAAGTCCAAGGGGCTTCCCTTTATCGAAATGTATGAAGAACTGCGTCGTGACGATAACTATCAGGGGCA
CAATCTGGAATTATTAGCCAGCTTAATAGAAAAGCATGGGTATGTAGAGGATGTGAAGAATTTTTTTGATTTTTT
25 TAA

4186.1

ATGAATGTAAATCAGATTGTACGGATTATTCCTACTTTAAAAGCTAATAATAGAAAATTAATGAAACATTTTATA
TTGAAACCTTGGAAATGAAGGCCTTGTTAGAAGAAATCGGCCCTTCTGTCACTAGGTGACCAACGGGTCTTGAAAA
30 GCTGGTTTTAGAAGAAGCTCCCAAGTATGCGTACTCGTAAGGTAGAGGGAAGAAAAAACTAGCTAGATTGATTGT
CAAGGTGGAATAATCCCTTAGAAAATTGAAGGAATCTTATCTAAAACAGATTGATTTCATCGATTATATAAAGGTCA
AAATGGCTACGCTTTTGAATTTTCTCACCAGAAGATGATTTGATTTTGATTTCATGCGGAAGATGACATAGCAAGT
CTAGTAGAAGTAGGAGAAAAAGCCTGAATTTCAAACAGATTGGGCATCAATTTCTTTAAGTAAATTTGAGATTTCTA
35 TGAATTACATCTCCCACTGATATCGAAAGTTTCTTGAATCATCTGAAATTGGGGCATCCCTTGATTTTTATCC
AGCTCAGGGGCAAGGATTTGACTGTGGACAATACGGTTACCTGGGACTTATCTATGCTCAAGTTCTTGGTCAATGAA
TTAGACATAGCAAGTCTTCGCCAGAAGTTTGAGTCTACTGAATATTTTATTCCTAAGTCTGAAAAATCTTCCTTG
GTAAAGATAGAAATAATGTTGAATTGTGGTTTTGAAGAAGTATGA

4186.2

ATGAAGTGGACCAAGATTATTAAAAAATAGAAGAACAAATCGAGGCAGGGATTTATCCCGGAGCCTCTTTTGGC
TATTTTAAGGACAATCAATGGACAGAGTTCTATTTAGGCCAGAGTGACCCAGAGCATGGCTTCGAGACTGAGGCA
GGACTAGTTTATGACCTAGCTAGTGTGACGAAGGTTGTTGGGGTTGGCACAGTTTGTACCTTCTTGTGGGAAATAG
40 GTCAATTAGATATTGATAGACTGGTAATAGATTTTTACCTGAGAGTGATTATCCAGACATCACTATTCGCCAGCT
CTTGACTCATGCAACAGACCTTGATCCTTTTATTCCTAATCGTGATCTTTTAACAGCCCCGTAATTAAGGAAGCG
45 ATGTTTCATCTCAACAGACGAAGTCAGCCAGCCTTCTTTATTCGGATGTCCATTTTTTGTGTTGGGCTTTATTTT
GGAAAGAATTTTAAATCAAGATTGGGATGTGATTTTAAAGGATCAAGTCTGGAAACCTTGGGGAATGACGGAAC
TAAGTTTGGGCCAGTTGAGCTTGCTGTTCCAACAGTTAGAGGTGTAGAGGCAGGCATAGTGATGCCAAGGC
TCGTCCTCTGGGTAGACATGCTGGGAGTGCTGGTTTATTTTCGACTATAAAGGATTTACAAATCTTTTGAACAC
50 TATTTAGCAGATGATTTTGAAGAGACTTAAATCAAAATTTTTCTCCTTTGGATGACAAGGAACGTTCTTTAGCAT
GGAATTTGGAAGGAGATTGGCTAGACCATACGGGCTATACAGGTACCTTTATCATGTGGAATCGTCAGAAGCAAG
AAGCCACTATTTCTATCGAATCGTACCTATGAAAAGGACGAGAGAGCTCAATGGATATTAGACCGCAATCAAG
TGATGAACCTTGATTGCAAGAAGAGTAA

4187.2

ATGATGAAGAAGACTTATAATCATATTTTGGTCTGGGGAGTCATTTTCTATAGCATTTGCATTGTCTGTTTTTGTCTT
TACTCCTCAAGAACAATCTACCGTGGGAGTGGGAACTCCAGGTATTCAGCATCTTGGACGCCTGGTTTTTCTTTTG
ACTCCTTTCAATTCTCTCTGGAACTGGGCGAAGTGAGTGACATTGGACAATTATGTTGGATTTTTTACAAAATA
TCCTCAATGTCTTCTGTTTTTCTCTGATTTTCCAACCTCTTATCTATTTCCAAATTTGCGGAAAAACAAAAAAG
55 GTCCTTCTTTTTAGTTTTCTTGTGAGTCTTGGAAATCGAGTGTACGCAATTAATCTTGGACTTTTTCTTTGATTTCAAT
60 CGCGTCTTTGAGATTGATTTTGTGGACCAACACTTTGGGTGGCTATCTGGCTTGGCTCCTTTATAAACGATTAC
ATAAAAACAAGGTAAGGAATTAA

5

4188.2

15

4188.5

30

4188.10

35

4188.11

60

65

AGCGGTTCTGTAACAGATGAAAAAGTTAGCAAATATACAACTGATGATCCTAAATTCGTCAAAGGCTTTGAAAA
GCAACTAGCTGGATTAAAGACAATTTGATCAATAATGGTTTACAATTTGACGGTGGGGCAGATATCCAAAACTTT
GCCAACGGTCAAAACATCTTACACAATCCTTTGGGCACCAGCTCAAAATGGTATCCAAGCTAAACTTTTAGAAGCA
5 AGTAAGGTAGAAGTGGTAGAAGTACCATTTCCCATCAGACGAAAGGTAAGCCAGCTCTTGAGTACCTTGTAAACGGG
TTTGACGTATTCAACAATAAAGACGACAAGAAAGTCGCTGCATCTAAGAAATTCATCCAGTTTATCGCAGATGAC
AAGGAGTGGGGACCTAAAGACGTAGTTTCGTACAGGTGCTTTCCAGTCCGTACTTCATTTGAAAACTTTATGAAG
ACAAACGCATGGAAACAATCAGCGGCTGGACTCAATACTACTCACCATACTACAACACTATTGATGGATTGTGCTG
AAATGAGAACACTTTGGTTCCCAATGTTGCAATCTGTATCAAATGGTGACGAAAAACCAGCAGATGCTTTGAAAG
10 CCTTCACTGAAAAAGCGAACGAAACAATCAAAAAAGCTATGAAACAATAG

4188.12

ATGCAATCTACAGAAAAAAACCATTAAACAGCCTTTACTGTTATTTCAACAATCATTGTGCTTGTGACTGTGC
TGTTCACTTTTCCATTCTACTGGATTTTGACAGGGGCATTCAAATCACAACCTGATACAATTGTTATTCCTCCTCAG
15 TGGTTCCTAAAATGCCAACCATGGAAAACTTCCAACAACCTCATGGTGAGAACCTGCCTTGCAATGGATGTGG
AACTCAGTATTTATCTCATTGGTAACCATGTTCTTAGTTTGTGCAACCTCATCTCTAGCAGGTTATGTATTGGCTAA
AAAACGTTTCTATGGTCAACGCATTCTATTGCTATCTTTATCGCTGCTATGGCGCTTCCAAAAAAGTTGCTCTTG
TACCATTGGTACGTATCGTCAACTTCATGGGAATCCATGATACTCTCTGGGCAGTTATCTTGCTTTGATTGGATG
GCCATTCCGGTGTCTTCTCATGAAACAGTTCAGTGAAAAATATCCCTACAGAGTTGCTTGAATCAGCTAAAATCGAC
20 GGTGTGGTGAGATTTCGTACCTTCTGGAGTGTAGCCTTCCCGATTGTGAAACCAGGGTTTGACGCCCTTGCAATCT
TTACCTTCATCAATACTTGGAAATGACTACTTCATGCTCAATTTGTAATGTTGACTTCACGTAACAAATTTGACCATCTCA
CTTGGGGTTGCGACCATGCAGGCTGAAATGGCAACCAACTATGGTTTGATTATGGCAGGAGCTGCCCTTGCTGCTG
TTCCAATCGTCACAGTCTTCTAGTCTTCCAAAAATCCTTCAACAGGGTATTACTATGGGAGCGGTCAAAGGATA
A

4191.1

ATGAAAAAACTTTTTTCTTACTGGTGTAGGCTTGTTTTGCCTTCTTCCACTCTCTGTTTTTGCCATTGATTTCAAG
ATAAACTCTTATCAAGGGGATTTGTATATTATCATGCAGACAATACGCGCAGAGTTTAGACAGAAAGATAGTTTACCAGT
25 TTGAGGAGGACTTTAAGGGCCAAATCGTGGGACTTGGACGTGCTGGTAAGATGCCTAGCGGGTTTGACATTGACC
CTCATCCAAAGATTACAGGCCGCGAAAAACGGTGCAGAACTAGCAGATGTGACTAGCGAAAGTAACAGAAAGCG
30 GATGGTTATACTGTGAGAGTCTATAATCCAGGTGAGGAGGGCGACATAGTTGAAGTTGACCTCGTCTGGAACCTTA
AAAAATTTACTTTTCTTTATGATGATATCGCTGAATTTAAATTTGGCAACCTCTGACAGATAGTTTACAGTCTATTG
AAAAGTTTGAATTTTATGTAAGGGGAGACAAGGGGGCTGAAAACTCTTTTCCATACAGGGAACCTTTTTAGAG
AGGGAACGATTGAAAAAGAGTAACCTTGATTATACTATCCGTTTAGACAATCTTCCGGCTAAGCGTGGAGTTGAGTT
35 GCATGCCTATTGGCCTCGGACCGATTTTGTAGCGCTAGGGATCAGGGATTGAAAGGGAATCGTTTGAAGAGTTT
AATAAGATAGAAGACTCGATTGTTAGAGAAAAAGATCAGAGTAAACAACCTCGTTACTTGGGTCTCTCCCTTCGATC
CTTTCCATCTCCTTGTATTGAGTGTCTGCTTCTATTTTATTTATAGAAGAAAGACCACTCCTTCAGTCAAAATATGC
CAAAAATCATCGTCTCTATGAACCACCAATGGAATTAGAGCCTATGGTTTTATCAGAAGCAGTCTACTCGACCTCC
40 TTGGAGGAAGTGAGTCCCTTGGTCAAGGGAGCTGGAAAAATTCACCTTTGATCAACTTATCAAGCTCTGCTAG
ATGTGATAGACCGTGGGAATGTCTCTATCATTTTCAAGAGGAGATGCAGTTGGTTTGGAGCTAGTAAAGAAAGATG
GTTTGTCAAGCTTTGAGAAAGAGCTGCCTAAATCTAGCTTTTTCAGGTAAAAAAGAAAGAACTCTTTCCAATTTGTT
TGCGGATTAAAGGTATCGATAGTCTTTATCGTAGAGCCAAAGTTTCTGATGAAAAACGGATTCAAGCAAGAGG
GCTTCAACTCAAACTCTCTTTTGAAGAGGTATTGAACCAGATGCAAGAAGGAGTGAGAAAAACGAGTTTCTTCTGG
45 GGGCTCCAGATTATTATCGTCTTTAACTGGTGGGAAAAAGGCCTTGCAAGTGGGTATGGGTGCCTTGACTATCC
TGCCCTATTTATCGGATTTGGTTTGTCTTGTACAGTTTACAGCTTTCATGGCTATCTTTACCTCCCTTTGCCAATA
CTTGGTTTTCTAGGGTTAGTTTTGTCTGTTTTCTATTATTGGAAGCTTCGACTAGATAATCGTGATGGTGTTCTAAA
TGAAGCGGGAGCTGAGGTCTACTATCTCTGGACCAGTTTGGAAATATGTTGCGTGAGATTGCACGATTGGATCAG
50 GCTGAACTGGAAAGTATTGTTGCTGGAATCGCCTCTTGGTCTATGCGACCTTATTTGGCTATGCGGACAAGGTTA
GTCATTTGATGAAGGTTTATCAGATTCAAGTGAAAAATCCAGATATCAATCTCTATGTAGCTTATGGCTGGCACAG
TACGTTTTATCATTTCAACAGCACAAATGAGCCATTATGCTAGTGTGCGAAATACAGCAAGCACTACTCTGTATCT
TCTGGAAGTGGAAGTTCTGGTGGTGGCTTCTCTGGAGGCGGAGGTGGCGGCAGTATCGGTGCCTTTTAA

4191.2

ATGAAAAAAGTAAGAAAGATATTTTCAAGAGGCAGTTGCAGGACTGTGCTGTATATCTCAGTTGACAGCTTTTTCTT
55 CGATAGTTGCTTTAGCAGAAACGCCTGAAACCAGTCCAGCGATAGGAAAAAGTAGTGATTAAAGGAGACAGGCGAAG
GAGGAGCGCTTCTAGGAGATGCCGTCTTTGAGTTGAAAAACAATACGGATGGCACAACCTGTTTCGCAAAGGACAG
AGGCGCAAAACAGGAGAAGCGATATTTTCAAAACATAAAACCTGGGACATACACCTTGACAGAAGCCCCAACCTCCAG
TTGGTTATAAACCTCTACTAAACAATGGACTGTTGAAGTTGAGAAGAATGGTCGGACGACTGTCCAAGGTGAAC
AGGTAGAAAAATCGAGAAGAGGCTCTATCTGACCAGTATCCACAACAGGGACTTATCCAGATGTTCAAAACACCTT
60 ATCAGATTATTAAGGTAGATGGTTTCGAAAAAAGACGACAGCACAAAGGCGTTGAATCCGAATCCATGAACGTTG
TGATTCCAGAAGGTACACTTTCAAAGAGAATTTATCAAGTGAATAATTTGGATGATAACCAATATGGAATCGAATT
GACGGTTAGTGGGAAAAACAGTGTATGAACAAAAAGATAAGTCTGTGCGCTGGATGTGCTTATCTTGCTCGATAA
CTCAAATAGTATGAGTAACATTCGAAACAAGAATGCTCGACGTGCGGAAAGAGCTGGTGAGGCGACACGTTCTCT
TATTGATAAAATTACATCTGATTTCAGAAAAATAGGTAAGCCTTGTGACTTATGCTTCCACTATCTTTGATGGGACC
65 GAGTTTACAGTAGAAAAAGGGGTAGCAGATAAAAAACGGAAAGCGATTGAATGATTCTCTTTTTTGAATTTATGAT
CAGACGAGTTTTACAACCAATACCAAAAGATTATAGTTATTTAAAGCTGACTAATGATAAGAATGACATTGTAGAAT

TAAAAAATAAGGTACCTACCGAGGCAGAAGACCATGATGGAAATAGATTGATGTACCAATTCGGTGCCACTTTTA
CTCAGAAAAGCTTTTGATGAAGGCAGATGAGATTTTGACACAACAAGCGAGACAAAATAGTCAAAAAGTCATTTTCC
ATATTACGGATGGTGTCCCACTATGTCGTATCCGATTAATTTTAATCATGCTACGTTTGTCCATCATATCAAAAT
CAACTAAATGCATTTTGTAGTAAATCTCCTAATAAAGATGGAATACTATTAAGTGATTTTATTACGCAAGCAACTA
5 GTGGAGAACATACAATTGTACGCGGAGATGGGCAAAGTTACCAGATGTTTACAGATAAGACAGTTTATGAAAAAG
GTGCTCCTGCAGCTTTCCAGTTAAACCTGAAAAATATTCTGAAATGAAGGCGGCTGGTTATGCAGTTATAGGCGA
TCCAATTAATGGTGGATATATTTGGCTTAATTGGAGAGAGAGTATTCTGGCTTATCCGTTTAAATCTAATACTGCTA
AAATTACCAATCATGGTGACCCTACAAGATGGTACTATAACGGGAATATTGCTCCTGATGGGTATGATGCTTTTAC
10 GGTAGGTATTGGTATTAACGGAGATCCTGGTACGGATGAAGCAACGGCTACTAGTTTATGCAAAAGTATTCTAGT
AAACCTGAAAACTATACCAATGTTACTGACACGACAAAAATATTGGAACAGTTGAATCGTTATTTCCACACCATC
GTAATGAAAAAGAAATCAATTGAGAATGGTACGATTACAGATCCGATGGGTGAGTTAATTGATTGCAATTGGGC
ACAGATGGAAGATTTGATCCAGCAGATTACACTTTAACTGCAACGATGGTAGTCGCTTGGAAGATGGACAAGCT
GTAGGTGGTCCACAAAATGATGGTGGTTTGTAAAAAATGCAAAAGTGTCTATGATACGACTGAGAAAAGGATT
CGTGTAAACAGGTCTGTACCTTGAACGGATGAAAAAGTTACGTTGACCTACAATGTTCTGTTGAATGATGAGTTTG
15 TAAGCAATAAATTTTATGATACCAATGGTTCGAACAACCTTACATCCTAAGGAAGTAGAACAGAACACAGTGGCGG
ACTTCCCGATTCTAAGATTCTGTGATGTGCGGAAGTATCCAGAAATCACAATTTCAAAAGAGAAAAAAGGATT
ACATTGAGTTTATTAAGGTCAATAAAAAATGATAAAAAACCACTGAGAGGTGCGGTCTTTAGCTTCAAAAAACAAC
ATCCGGATTATCCAGATATTTATGGAGCTATTGATCAAAATGGCACTTATCAAAATGTGAGAACAGGTGAAGATG
GTAAGTTGACCTTTAAAAATCTGTGATGAGGAAATATCGATTATTTGAAAAATCTGAACAGCTGGTTATAAACC
20 CGTTCAAAATAAGCCTATCGTTGCCTTCCAAATAGTAATGGAGAAGTCAGAGATGTGACTTCAATCGTTCCACAA
GATATACCAGCGGGTTACGAGTTTACGAATGATAAGCACTATATTACCAATGAACCTATTCCTCCAAAGAGAGAA
TATCCTCGAACTGGTGGTATCGGAATGTTGCCATTCTATCTGATAGGTTGCATGATGATGGGAGGAGTTCTATTAT
ACACACGGAAACATCCGTAA

4191.3

ATGAAATCAATCAACAAATTTTAAACAATGCTTGTGCTTATTACTGACAGCGAGTAGCCTGTTTTAGCTGCAA
CAGTTTTTGGCGGTGGGACGACAACAACATCTGTTACCGTTTCATAAACTATTGGCAACAGATGGGGATATGGATA
30 AAATTGCAAAATGAGTTAGAAAACAGGTAACATGCTGGTAATAAAGTGGGTGTTCTACCTGCAAAATGCAAAAGAAA
TTGCCGGTGTATGTTTGGTGGACAAATACTAATAATGAAATTATTGATGAAAATGGCCAAACTCTAGGAGTGAA
TATTGATCCACAAACATTTAACTCTCAGGGGCAATGCCGGCACTGCAATGAAAAAATTAACAGAAGCTGAAGG
AGCTAAATTTAACACGGCAAATTTACCAGCTGCTAAGTATAAAATTTATGAAATTCACAGTTTATCAACTTATGTC
GGTGAAGATGGAGCAACCTTAACAGGTTCTAAAGCAGTTCCAATTGAAATTGAATTACCATTGAACGATGTTGTG
35 GATGCGCATGTGTATCCAAAAAATACAGAAGCAAAAGCCAAAAATTTGATAAAGATTTCAAAGGTAAAGCAAAATCCA
GATACACCACGTGTAGATAAAGATACACCTGTGAACCACCAAGTTGGAGATGTTGTAGAGTACGAAATTTGTTACA
AAAAATTCAGCACTTGCTAATTATGCAACAGCAAACTGGAGCGATAGAATGACTGAAGGTTTGGCATTCAACAAA
GGTACAGTGAAGTAAGTGTGATGATGTTGCACTTGAAGCAGGTGATTATGCTCTAACAGAAGTAGCAACTGGTT
40 TTGATTTGAAATTAACAGATGCTGGTTTGTGCTAAAGTGAATGACCAAAACGCTGAAAAAAGTGTGAAAAATCACTT
ATTCGGCAACATTGAATGACAAAGCAATTTGAGAAGTACCAGAATCTAATGATGTAACATTTAACTATGGTAATA
ATCCAGATCACGGGAATACTCCAAAGCCGAATAAGCCAAATGAAAACGGCGATTGACATTGACCAAGACATGGG
TTGATGCTACAGGTGCACCAATTCGGGCTGGAGCTGAAGCAACGTTTCGATTGTTGTTAATGCTCAGACTGCTAAAGT
TGTACAACTGTAACCTTTGACAACAGACAAAAATACAGTTACTGTTAACGGATTGGATAAAAAATACAGAATATAA
45 ATTCGTTGAACGTAGTATAAAGGGTATTCAGCAGATTATCAAGAAATCACTACAGCTGGAGAAATTTGCTGTCAA
GAACTGGAAAAGACGAAAAATCCAAACCCTTGATCCAAAGCAAGGCAAAAGTTGTTACATATGGTAAAAAGTTTGT
CAAAGTTAATGATAAAGATAATCGTTTGTGCTGGGGCAGAAATTTGTAATTGCAAAATGCTGATAATGCTGGTCAATAT
TTAGCACGTAAAGCAGATAAAGTGAGTCAAGAAGAGAAAGCAGTTGGTTGTTACAACAAAGGATGCTTTAGATAGA
GCAGTTGCTGCTTATAACGCTCTTACTGCACAACAACAACTCAGCAAGAAAAAGAGAAAGTTGACAAAGCTCAA
50 GCTGCTTATAATGTGCTGTGATTGCTGCCAACAAATGCATTTGAATGGGTGGCAGATAAAGGACAATGAAAAATGTTG
TGAAATTAGTTTCTGATGCACAAGGTCGCTTTGAAATTACAGGCCTTCTTGCAGGTACATATTACTTAGAAGAAAC
AAAACAGCCTGTGCTGTTATGCATTACTAAGCTAGCCGTCAGAAATTTGAAGTCACTGCAACTTCTTATTCAGCGACT
GGACAAGGCATTGAGTATACTGCTGGTTCAAGTAAAGATGACGCTACAAAAGTAGTCAACAAAAAATCACTATC
CCACAAACGGGTGGTATTGGTACAATTCTTGTGCTGAGCGGGGCTGCGATTATGGGTATTGCAGTGTACGCAT
55 ATGTTAAAAACAACAAAGATGAGGATCAACTTGCTTAA

4191.4

ATGACAATGCAGAAAATGCAGAAAATGATTAGTCGTATCTTCTTTGTTATGGCTCTGTGTTTTCTCTTGTATGGGG
TGCACATGCAGTCCAAGCGCAAGAAGATCACACGTTGGTCTTGCAATTGGAGAATATCAGGAGGTGGTTAGTCA
ATTGCCATCTCGTGTATGGTATCGGTTGCAAGTATGGAATTGGATGATTCTGATTCTATGATGATCGGGTGCAA
60 ATTGTAAGAGACTTGCATTTCGTGGGATGAGAATAAACTTTCTTCTTTCAAAAAGACTTCGTTGATGATCACTTCC
TTGAGAATCAGATTGAAGTATCTCATATCCAAATGGTCTTTACTATGTTCTGCTCTATTATCCAGACGGATGCGGT
TTCTTATCCAGCTGAATTTCTTTTGAATGACAGATCAAAACGGTAGAGCCTTTGGTCAATTGTAGCGAAAAAACA
GATACAAATGACAAACAGGTGAAGCTGATAAAGGTGATCAAGACCACAATCGCTTGGAGGTTGCGGCTTTAAA
TTGGTATCAGTAGCAAGAGATGTTTCTGAAAAAGAGGTTCCCTTGATTGGAGAATACCGTTACAGTTCTTCTGGTC
65 AAGTAGGGAGAACTCTCTATACTGATAAAAAATGGAGAGATTTTGTGACAAATCTCTCTTGGGAACATCGTTT

CAAGGAGGTGGAGCCACTGGCAGGCTATGCTGTTACGACGCTGGATACGGATGTCCAGCTGGTAGATCATCAGCT
GGTGACGATTACGGTTGTCAATCAGAAATTACCACGTGGCAATGTTGACTTTATGAAGGTGGATGGTCGGACCAA
TACCTCTCTTCAAGGGGCAATGTTCAAAGTCATGAAAGAAAGAAAGCGGACACTATACTCTGTTCTTCAAAATGGT
AAGGAAGTAGTTGTAAACATCAGGGAAAGATGGTCGTTTCCGAGTGGAAGGTCTAGAGTATGGGACATACTATTTA
TGGGAGCTCCAAGCTCCAAGTGGTTATGTTCAATTAACATCGCCTGTTTCTTTACAATCGGGAAAGATACTCGTA
AGGAAGTGGTAACAGTGGTTAAAAATAACAAGCGACCAAGGATTGATGTGCCAGATACAGGGGAAGAAACCCTTG
TATATCTTGATGCTTGTGGCCATTTTGTGTTTGGTAG

4191.5

ATGAGCCACATATACTTATCTATTTTACAAGTCTCTTGCTGATGCTAGGACTTGTCATGTTGCTCAAGCCGATG
AATATTTACGCATCGGTATGGAAGCAGCATATGCTCCCTTTAACTGGACCCAGGATGATGATAGCAACGGAGCTG
TCAAAATCGATGGGACCAATCAGTATGCCAACGGATACGATGTTCAAATCGCCAAGAAAAATCGCTAAGGACTTAG
GTAAAGAACCTTTGGTTGTTAAAAACCAAGTGGGAAGGTCTAGTCCCTGCCCTTACTTCTGGTAAGATTGACATGAT
TATCGCAGGTATGAGTCCAACTGCAGAACGCAAAACAAGAAATTGCTTTTCGAGCAGTTACTATACTAGCGAACC
AGTTTTGCTGTGCAAAAAAGATTCTGCCTACGCAAGTGCTAAATCTTTGGATGACTTTAACGGTGCAAAAACTACT
TCTCAACAAGGGGTCTACCTTTATAAATTGATTGCACAAATCCCAGGTGCTAAAAAAGAAACAGCCATGGGAGAC
TTCGCTCAAATGCGACAAGCTCTTGAGGCTGGTGTCATTGATGCTTATGTTTCTGAACGTCCAGAAGCACTGACTG
CTGAAGCTGCGAACTCTAAGTTCAAGATGATTCAAGTAGAACCTGGTTTCAAACTGGGGAAGAAGATACAGCTA
TCGCTATCGGGCTTCGTAAAAATGACAATCGTATTAGCCAAATCAATGCCAGCATTGAAACCATTTCAAAAGATG
ACCAAGTTGCCCTTGATGGATCGTATGATCAAGGAACAACCTGCCGAAGCTACAACAACCTGAAGAGACTAGCAGTA
GTTTCTTTAGCCAAAGTTGCTAAAAATCTTTCTGAAAACTGGCAACAACCTCTTGCGTGGTGCTGGTATCACTCTTTTA
ATCTCTATCGTCGGAACCATCATAGGTCTCATTATTGGACTTGCCATTGGTGTCTTCCGTACTGCTCCTCTCTGA
AAAAAAGTCATTACGGCCTACAAAACTAGTCGGGTGGTTCTCAATGTCTACATTGAAATTTTCCGTGGTACG
CCAATGATTGTTCAATCGATGGTTATCTACTATGGAAGCTGCCAAGCTTTCGGGATCAACC
TTGACCGTACACTGGCTGCTATCTTATCGTTTCAATCAATACCGGTGCCTACATGACTGAAATCGTCCGTGGTGG
TATCCTAGCAGTTGACAAGGGACAATTTGAAGCTGCGACTGCTCTTGGTATGACCCATAACCAGACCATGCGTAA
GATTGTCTACCTCAGGTAGTCCGTAACATCCTACCTGCAACTGGTAATGAATTTGTATCAATATCAAAGATACA
TCTGATTGAACGTTATCTCTGTTGTGCAACTTTATTTCTCAGGAAATACCGTGGCAACACAAACCTATCAATACTT
CCAGACATTTACAATCATCGCCGTGATTTACTTTGTCTCCTCACCTTACCCTAACACGATCCTACGCTTTATCGAGC
GCAGAATGGACATGGATACCTACACTACAGGTGCTAACCAATGCAAAACGGAGGATTTGAAATAA

4191.6

ATGACACAAGCAATCCTTGAAATTAACACCTCAAAAAATCCTATGGACAAAACGAAGTGCTAAAAGACATTTCA
CTCACTGTCCACAAGGGAGAGGTCTATCTATCATCGGAAGCTCTGGAAGCGGAAAAATCGACCTTCTACGTCTCC
ATTAACCTACTTGAAACACCAACTGATGGACAAAATCCTTATCATGGACAAAACGTCCTCGAAAAAGGATGATGAC
CTCACGCAATACCGTGAAAAAGTTGGGGATGGTTTTCCAATCCTTTAACCTCTTTGAAAAATCTCAATGTTCTTGA
ACACAATCGTCGCTCAGACAACCTGTCTAAAACGCGAACGACAGAAAGCTGAAAAGATTGCCAAAAGAAAACCTG
GAAAAGGTGCGCATGGGAGAACGCTACTGGCAAGCCAAACCAAACTCTCAGGTGGTCAAAAACCAACAGCTGT
GGCCATCGCTCGTCCCTCTCCATGAATCCGGACGCTATTCTTTGATGAACCAACATCAGCTCTCGATCCAGAA
ATGGTTGGAGAAGTCTCAAAATCATGCAGGACCTGGCTCAGGAAGGCTTGACCATGATTGTCTGAACCCATGAA
ATGGAATTTGCCCGTGATGTCTCTCACCGTGTATCTTTATGGATAAGGGCGTGATCGCTGAAGAAGGTAACCCAG
AAGACCTCTTACCAATCCTAAAGAAGACCGAACAAAAGAGTTCCTTCAACGCTATCTCAAATAA

4192.3

ATGAAAAAGTATCAACTTCTATTCAAAAATAAGTGCAGTCTTCTCTTACTTATTTTTCTGATTTTGTCTTTCTCAGCT
GACGCTTATCGTCCAAAACTATTGGCAATTTCTTCTCAGATAGGCAATTTATTTCTGGATTCAAAATATCTTGAGTT
TACTTTTTATTGGAGTCATGATTGTGGTTCTTGTTAAGACAGGCCATGGTTATCTCTTCCGATTCCAAGAAAAA
ATGGCTTTGGTATTGATTTTACAGTATTAGTGCTAGTGTCCAGATCTCTTTAACGTTCCAGACAGCTAAACATG
TTCAGTCAACTGCGGAAGGTTGGGCTGTATTGATTGGTTATAGTGGGACTAACTTTGCAGAGCTAGGTATTATAT
AGCCCTGTTCTTTCTGGTTCCACTGATGGAAGAATTGATTTATAGAGGATTACTGCAACATGCTTTCTTTAAGCATT
CGCGATTTGGTCTTGATTGCTTCTCCTTCTATTTTATTTGCTCTCCCTCATTTTCAAGCTGCGCTAGTCTGTTAG
ATATCTTCGTCTTTGCAACAGTTGGAATCATCTTGTCTGGTTTGACCCGCTATACCAAGAGCATTTATCCATCCTAT
GCGGTGCATGTGATCAATAATATTGTAGCGACCTTCCCGTTTTTGTCTACTTTTCTACATAGGGTCTTGGGGTAA

4193.1

ATGAACAAGAAACAATGGCTAGGTCTTGGCCTAGTTGCAGTGGCAGCAGTTGGACTTGCTGCATGTGGTAACCGC
TCTTCTCGTAACGCAGCTTCATCTTCTGATGTGAAGACAAAAGCAGCAATCGTCACTGATACTGGTGGTGTGATG
ACAAATCATTAACCAATCAGCTTGGGAAGGTTTGACAGGCTTGGGGTAAAGAACACAATCTTTCAAAAGATAACG
GTTTCACTTACTTCCAATCAACAAGTGAAGCTGACTACGCTAACAACTTGCAACAAGCGGCTGGAAGTTACAACCT
AATCTTCGGTGTGGTTTGGCCTTAATAATGCAGTTAAAGATGCAGCAAAAGAACACACTGACTTGAAGTATGTC
TTGATTGATGATGTGATTAAAGACCAAAAGAATGTGCGAGCGTAACCTTTCGCTGATAATGAGTCAGGTTACCTTG
CAGGTGTGGCTGCAGCAAAAACAATAAGACAAAACAAGTTGGTTTGTAGGTGGTATCGAATCTGAAGTTATCT
CTCGTTTTGAAGCAGGATTCAAGGCTGGTGTGCGTCAGTAGACCCATCTATCAAAGTCCAAGTTGACTACGCTGG
TTCATTTGGTGATGCGGCTAAAGGTAAGCAATTGCAGCGCAACATACGCAGCCGGTGAGATTTGTTTACCA
AGTAGCTGGTGGTACAGGTGCAGGTGCTTTGCGAGAGGCAAAATCTCTCAACGAAAGCCGCTCTGAAAAATGAAAA

AGTTTGGGTTATCGGTGTTGATCGTGACCAAGAAGCAGAAGGTAATACACTTCTAAAGATGGCAAAGAATCAAA
CTTTGTTCTTGATCTACTTTGAAACAAGTTGGTACAACGTGTAAGATATTTCTAACAAGGCAGAAAGAGGAGAA
TTCCCTGGCGGTCAAGTGATCGTTTACTCATTGAAGGATAAAGGGGTTGACTTGGCAGTAACAAACCTTTCAGAA
AAGGTAAGCTGTGCGAAGATGCAAAAGCTAAATCCTTGATGGAAGCGTAAAGT
TCCTGAAAAATAA

4193.3

ATGTCTAAAAAATTACAACAAATTTTCGGTTCCTTGATTTCTGTATTCTAGGAATTTTACTCGGAGCCATTGTCAT
GTGGATCTTCGGTTATGATGCTATTTGGGGCTACGAAGAATTGTTCTATACAGCCTTTGGCAGTCTGCGTGGGATT
GGAGAAATCTTCCGTGCTATGGGTCTCTGGTCTTGATTGGTCTTGGTTTGGCGTTGCCAGTCGAGCTGGTTTCTT
TAACGTCGGAATCTTCTGGTCAGGCTTTGGCAGGTTGGATTCTCAGTGGTTGGTTTGGCCTGTGCGATCCAGATATG
CCCCGTCCCTTGATGATTCTAGCAACCATCGTGATTGCCTTGATTGCTGGTGGGATTGTGCGAGCGATTCCAGGTA
TTCTTAGGGCTATCTAGGGACGTCAGAGGTTATTGTAACCATCATGATGAACACTACATTGTCTTGTATGTAGGGAA
TGCCTTTATCCATGCTTTCCCTAAAGACTTCATGCAAGTACAGATTGACCATTCGTGTTGGGGCTAATGCAACC
TATCAGACACCTTGGTTGGCTGAGTTGACTGGTAACACCGATGAATATTGGTATTTCTTTGCCATCATTGCCGT
TGCAGTTATTTGGTTTATGCTCAAGAAAACAACCTTTGGTTTGAATCCGTGCGAGTTGGTCTTAATCCACATGCTT
CAGAATATGCTGGTATTTCTGCCAAGCGGACTATTATCCTATCTATGATTATTTCAAGGTGCCCTGGCAGGTCTTGGT
GGAGCTGTTGAAGGTTTGGGAACCTTCCAGAAGCTCTATGTTCAAGGTTCTGTCATTAGCTATCGGATTTAACGGAA
TGGCGGTTAGTTTGGCTTGGCGCAACTCACCATTGGTATACTCTTTCAGCCTTCTTATTTGGCGTTCTCCAAGTT
GGGGCTCCTGGTATGAATGCGGCGCAGGTACCATCTGAGCTTGTGAGCATTTGTAACAGCGTCTATTATCTTCTTTG
TCAGTGTTCATTACCTTATCGAACGCTTTGTCAAACCGAAAAACAAGTTAAAGGAGGTAAGTAA

4194.1

ATGGGAGTGAAAAAGAACTAAAGTTGACTAGTTTGTAGGACTGTCTCTGTTAATCATGACAGCCTGTGCGACT
AATGGGGTAACTAGCGATATTACAGCCGAATCGGCTGATTTTGGAGTAAATTGGTTTACTTCTTTGCGGAAATCA
TTCCGCTTTTATCGTTTGATATTAGTATCGGAGTGGGGATTATTCTCTTACGGTCTTGATTTCGTACAGTCTCTTG
CCAGTCTTTCAGGTGCAATGGTGGCTTCTAGGAAAATGCAGGAAGCTCAGCCACGCATTAAGGCGCTTCGAGAA
CAATATCCAGGTGAGATATGGAAAGCAGAACCAAACTAGAGCAGGAAATGCGTAAAGTATTTAAAGAAATGGG
TGTCAGACAGTCAGACTCTCTTTGGCCGATTTTGATTAGATGCCGGTTATTTGGCCCTGTTCCAAGCCCTATCAA
GAGTTGACTTTTAAAGACAGGTCAATTTCTTATGGATTAACTTGGTAGTGTGGATACAACCTTGTCTTCCGATT
TTAGCAGCAGTATTACCTTTTAAAGTACTTGGTTGTCCAACAAGCTTTGTCTGAGCGAAATGGCGCTACGACTG
CTATGATGTATGGGATTCAGTCTTGATTTTATCTTTGAGTTTATGCGCCAGGTGGAGTCGCCCTATACTGGAC
AGTGTCTAATGCTTATCAAGTCTTGCAACCTATTTCTGAATAATCCATTCAAGATTATCGCAGAGCGCGAGGCC
GTAGTACAGGCACAAAAAGATTTGGAAAAAGAAAAAGCAAGAAAAAGGCTCAGAAAACGAAATAA

4194.4

ATGGTTATCGATCCATTTGCTATCAACGAAGTACTATTACTTAGTTTACACTTCCACAGTGATCATATCGACC
CATACACAGCTGCAGCAATTCTCAATAATCCTAAGTTAGAGCATGTTAAGTTTATCGGTCTTACCACTGTGGACG
AATCTGGGAAGGATGGGGTGTTCAAAAGAACGTATCATCGTTGTTAAACCAGGTGACACTATCGAATTTAAAGA
TATGAAGATTATGAGTAGAATCATTTGACCGTACTTGCTTGGTAACTCTCCAGTGAACGGTGCTGATGAGACA
GGCGGTGAACCTTGCTGGCTTGGCTGTTACAGATGAAGAAATGGCTCAAAAGGCTGTTAACTATATCTTTGAAACAC
CAGGTGGAACCATCTATCATGGTGCAGATTCTCACTTCTCAAACCTATTTTGCAAAAACATGGTAAAGACTTTAAAT
TGATGTTGCTTTGAATAACTATGGTGAAAAATCCGGTAGGTATCCAAGACAAAATGACATCTATCGACCTTCTCTGT
ATGGCAGAAAATCTGCGTACCAAGTCATTATCCCAGTTCACTATGATATCTGGTCTAACTTCATGGCTCTACTA
ATGAGATTCTAGAACTTTGGAAAAATGCGAAAAGATCGCTTGAATACGATTCCATCCATTATCTGGGAAGTTGG
CGGTAAGTACACTTATCCTCAAGATCAACACTTAGTAGAATACCATCATCCACGTGGTTTGTGATGATTGTTTGA
CAAGACTCTAACATTCAATTTAAAGCTTTGCTATAA

4196.2

ATGTTCTCTTCAGGCTGGTTGTCTAGTTTGTCTAATACTTATATCCATGATTTACTGGGGGTTCTTTTCCAGATAG
TCCATTTTAAATGCCTTTGAAAGTGCTATTGCGGCTCCTTTGGTAGAAGAACCCTTGAAATTATTGTCACTTGTT
TTGTTTGGCTTTGATTCTGTGCGAAAAATAAAATCTTTGTTTACTTGGAATTGCTTCCGGTTTGGGATTCCAA
ATGATTAAGGATATTGGTTATATTGTCAGGATTGCCAGAGGGCTTTGACTTTACTATTTCCGCAATTTTAGAGC
GTATCATCTCAGGAATTGCCTCTCACTGGACTTTTTCAGGTCTAGCTGTAGTAGGTGTTTACTTGCTTTACAGAGCC
TATAAAGGACAGAAGGTTGGCAAGAAACAGGGCCTTATTTTCTAGGTTTAGCCTTGGGAACCTCACTTCTTGTTA
ACTCTCTTTTGTGGAGTTGGAAACAGAGTTGCCTTTAGCGATTCCAGTGGTTACGGCTATTGCTCTCTATGGTTTT
TATCATGCTTATTGCTTTGTTGAGAAACACAATGAGTTGATGACCTAG

4197.1

ATGAAGGTGGAACACGTTGCGACGTCCTTTTCAGGATGTGCGATTTTATTTATTAGGATACTAATTATGGAGTTGC
AAGAATTAGTGGAGCGCAGTTGGGCAATCCGACAAGCTTATCACGAAGTGAAGTTAAGCATCATGATTCCAAGT
GGACGGTAGAAGAAGACCTCTTGGCTTTATCTAATGATATTGGAAATTTCCAACGACTGGTGATGACAAAGCAAG

GACGCTACTATGATGAAACACCCTACACACTGGAACAAAACTTTCAGAAAATATCTGGTGGCTATTAGAACTTT
CTCAACGTTTGGATATAGACATTCTGACGGAAATGGAAGAACTTCCTCTCTGATAAGAAAAAGCAATTGAAACGTTA
GGACTTGGAAAGTAG

5

4197.4

ATGCTTGATTGGAACAATTTTTCTAGCCTATCTGCGCTCCCGTAGTCGCTTTTTATCTATCTGCTTTCTTTGGC
ATTTCTTGCTTACTCTTTTCAGTTTTTATTTGCCAGTCTAGGAATTTACTTCTCTACTTTTTCTTCTTGTTGCTTT
GTAACCATATTATTTTCACTTGGGACATATTGGTGGAAACGCAGGTCTATCGCCAGGAACCTTCTCTATGGAGAGA
GGGAAGCCAAGTCTCCTTTGGAAATAGCTTTAGCAGAAAAATTAGAAGCGCGTGAGATGGAACCTATCAGCAGA
GGTCAAAAGCAGAAAGAAAACTGACGGATTGCTGGATTACTATACCTTGTGGGTCCATCAGATAAAGACCCCCA
TTGCAGCCAGTCAACTCTTAGTTGCAGAAAGTGGTCGACCGCCAACGAAGCAGCAGCTAGAACAGGAAATTTTCA
AAATCGACTCCTATACCAACCTAGTTTTACAGTACCTGCGTTTAGAAAGTTTCCATGATGATTGGTCTTAAAGCA
GGTTCAAATTGAGGACTTGGTCAAGGAAATAAATTCGTAAATATGCTCTTTTCTTATTCAAAAAGGCTTAAATGTC
AATCTACATGACCTTGATAAAGAAATCGTGACGGATAAAAAAGTGGCTGCTAGTGGTTATTGAGCAAAATCATCTCA
AACAGTCTCAAGTACACCAAGGAAGGTGGTCTGGAGATTATATGGATGACCAAGAGCTTTGTATCAAAAGATACG
GGAATCGGGATAAAAAACAGTGTCTCCGAGTATTGAACGTGGCTTTTCAGGATACAATGGCCGTTTGACCC
AGCAGTCCCTCTGGACTTGGCTTTATCTATCTAAGAAAAATTTCTGAAGAACTGGGGCACCAGATTTCGTATCGAGTC
TGAGGTGCGAAAAAGGAACGACAGTGGGATTGCTCAAGTGAACCTAGTCCTTGAGTAA

10

15

20

4211.2

ATGGAACCTTAATACACACAATGCTGAAATCTTGCTCAGTGCAGCTAATAAGTCCCCTATCCGCAGGATGAACTG
CCAGAGATTGCCCTAGCAGGGCGTTCAAATGTTGGTAAATCCAGCTTTATCAACACTATGTTGAACCGTAAAGAAATC
TCGCCCCGTACATCAGGAAAACCTGGTAAAACCCAGCTCCTGAACTTTTTTAACATTGATGACAAGATGCGCTTTGT
GGATGTGCTGGTTATGGCTATGCTCGTGTCTTCTAAAAAGGAACGTGAAAAGTGGGGGTGCATGATTGAGGAGTA
CTTAACGACTCGGGAATCTCCGTGCGGTTGTCAGTCTAGTTGACCTTCGTATGACCCGTGAGCAGATGATGTG
CAGATGTACGAATTTCTCAAGTATTATGAGATTCCAGTCATCATTTGTGGCGACCAAGGCGGACAAGATTCTCTCGTG
GTAATGGAACAAGCATGAATCAGCAATCAAAAAGAAATTAACCTTTGACCCGAGTGACGATTTTCATCCTCTTTTC
ATCTGTCAGTAAGGCAGGGATGGATGAGGCTTGGGATGCAATCTTAGAAAAATTGTGA

25

30

4211.3

ATGACAAAAGAAACAACCTTCACTTGGTGATTGTGACAGGGATGAGTGGCGCAGGAAAACTGTAGCCATTCACTGCC
TTCCGAGGATCTAGGTTATTTACCATTGATAATATGCCGCCAGCTCTCTTGCCTAAGTTTTTGCACTGGTTGAAAT
TAAGGAAGACAATCCTAAGTTGGCCTTGGTAGTGGATATGCGTAGCCGTTCTTTCTTTTCAGAGATTCAAGCTGTT
TTGGATGAGTTGGAAAAATCAAGATGGTTTGGATTCAAAAATCCTCTTTTGGATGCGGCTGATAAGGAATTGGTCG
CGCTTACAAGGAACCCAGACGGAGTCACCCACTAGCAGCAGACGGTCGTATTTAGATGGAATCAAGTTGGAAC
GTGAACTCTTGGCACCTTTGAAAAATATGAGCCAAAATGTGGTGGATACGACTGAACTCACTCCACGTGAGTGGC
CAAAACCCTTGACAGAGCAGTTTTTCAGACCAAGAACAAGCCAGTCTTTCCGTATCGAAGTCATGTCTTTCCGATTT
AAGTATGGAATCCCGATTGATGCGGACTTGGTCTTTGATGTCGCTTTCTTGCCAAATCCCTATTATTACCAAGACT
GAGAAACCAACCGGTGTGGATGAACCTGTTTATGATTATGTCATGAACCATCCTGAGTCAGAAGACTTTTATCAA
CATTTATTGGCCTTGATTGAGCCGATTCTGCCAAGTTACCAAAAGGAAGGTAAGTCCGTTTTGACCATTTGCCATGG
GATGTACGGGTGGACAACACCGTAGTGTGGCATTGCTAAACGCTTGGCGCAGGACTTATCCAAGAATTGGTCTGT
TAATGAAGGGCATCGCGACAAAGACCGCAGAAAGGAACGGTAAACCGTTCATGA

35

40

45

4211.4

ATGAGAAAACCAAAGATAACGGTGATTGGTGGAGGGACTGGAAGTCCCGTCATTCTAAAAAGTCTGCGGGAAAAA
GATGTGGAATTCGCAGCTATCGTGACGGTGGCAGATGATGGTGGTTCTTCAGGTGAACTCCGAAAAAATATGCAA
CAGTTGACACCGCCAGGTGATCTTCGTAATGTCCTTGTGGCCATGTCGGATATGCCTAAGTTTTATGAGAAGGTCT
TTCAGTATCGGTTCTCTGAGGATGCCGGAGCCTTTGCTGGCCATCCATTGGGAAATCTCATATTGCTGGCTTGT
AGAAATGCAGGGTTCAACCTATAATGCCATGCAGTTATTGAGCAAAATTTTCCATACAACAGGGAAAAATTTATCCT
TCCAGTGACCATCCTTTGACCCTTCATGCAGTCTTTTCAGGATGGGACAGAAGTGGCTGGAGAGAGTCATATTGTAG
ACCATCGAGGCATAATTGACAAATGTCTATGTGACCAATGCCCTAAACGATGATACGCCTCTGGCCAGCCGTCGAG
TAGTGACAGCCATCCTTGAAGTGACATGATTGTCCTAGGGCCAGGTTCCCTCTTTACCTCTATTTTGCCCAATAT
CGTGATTAAAGGAAATTGGGCGGGCTCTTTTGGAAACCAAGGCAGAAATTCCTATGTCTGCAATATCATGACCCA
ACGTGGGGAGACGGAACACTTTACAGATAGCGACCACGTGGAAGTCTTGATCGTCACCTTGGTCGCCCTTTATC
GACACTGTCTTGGTGAATATTGAAAAAGTGCCTCAGGAATACATGAATTCACACCGTTTTGATGAATACTTAGTGC
AAGTGAACACGATTTTGTAGGTCTTTGTAAAGCAAGTTTCGCGCGTGATTTCATCTAACTTCCTCTGCTGAAAAA
TGGCGGTGCTTCCACGATGGAGATTGATTGTGGACGAGTTGATGCGCATTATACAGGTGAAAAAATGA

50

55

60

4213.1

ATGAAAAATTGATAAAGTTGCTAATAATTAGATTGATTGTTAACTTAGCAGACAGTGTATTTTATATAGTAGCAT
TGTGGCACGTTAGCAATAATTATTCTTCGAGCATGTTCTTAGGAATATTTATTGCAGTAAATTATCTACCGGATTG
TTACTAATCTTTTTTGGACCAGTTATTGACAGAGTAAATCCGCAAAAAATCTTATAATATCAATTTTGGTTCAATT
AGCAGTGGCTGTAATATTTTATTATTATTAACCAAAATATCATTTTGGGTGATAATGAGTCTAGTGTTTATTTCAG
TAATGGCTAGCTCCATAAGTTACGTGATAGAAGATGTGTTGATTCTCAAGTGGTAGAATATGATAAGATTGTATT
TGCAAAATCTCTTTTTTAGTATTTCTGTATAAAGTATTAGATTCTATTTTTAATTCATTTCGCATCATTTTTACAGGTG

65

5 CAGTAGGATTTATTTTATTGGTTAAGATAGATATAGGCATATTTTACTTGCTCTATTTATATTGTTGTTGTTAAAA
TTTAGAACTAGCAATGCGAATATAGAAAACCTCTCTTCAAATATTACAAGAGAGAAGTGTGCAAGGTACAAAG
TTTATTTTAAATAATAAAATTATTATTTAAAACAGTATTTCTTTAACGCTTATAAACTTTTTTATTTCATTTCAGACA
GTAGTTGTACCGATTTTTCTATTGATATTTTGATGGTCCGATTTTTATGGTATTTTTTAACTATTGCTGGTTTTG
GGTGGTATATTGGGAAATATGCTAGCGCCAATCGTAATAAAATATTTAAAATCGAATCAAATTGTTGGTGTATTTTC
TTTTTTGAACGGCTCAAGTTGGTTAGTAGCAATTGTTATAAAAGACTATACITTTATCACTATTTTTATTTTTCGTTT
GTTTTATGTCTAAAAGGAGTCTTCAATATTATTTTAAATTCGTTGTACCAACAAATACCTCCACATCAACTTCTGGT
AGGGTAAATACTACCATTGATTCTATTATTTCTTTGGAATGCCAATTGGTAGTTTAGTTGCAGGAACGCTTATTGA
10 TTTGAATATTGAATTAGTGTTAATTGCTATTAGCATACCTTATTTTTGTTTTCTTATATTTTTTATACGGATAATGG
ATTGAAAGAATTTAGTATATATTAG

4213.2
15 ATGATGTCTAACAAAAATAAGGAAATCTGATTTTTGCGATTCTCTATACAGTCCTCTTTATGTTTGATGGCGTTAA
ATTGCTGGCTTCTTTAATGCCATCTGCCATTGCAAATATCTTGTTTATGTAGTTTATAGCTCTATATGGCTCCTTCTT
GTTCAAGGATAGATTGATCCAACAATGGAAGGAGATTAGAAAGACTAAAAGAAAAATCTTCTTTGGAGTCTTAAC
AGGATGGCTCTTCTCATTCTGATGACTGTTGTCTTTGAATTTGTATCAGAGATGTTGAAGCAGTTTGTGGGACTAG
ATGGACAAGGTCTAAATCAGTCTAATATTCAAAGTACCTTTCAAGAACAACCACTACTGATAGCTGTTTTGCTTG
TGTCATTGGACCTCTGGTAGAAGAATTATTTTTCCGTCAGGTCTTATTGCATTACTTGCAGGAACGGTTGTCAGGTT
20 TACTAAGCATTATCTGGTAGGACTGTTTTGCTCTGACTCATATGCACAGTTTGGCTCTATCAGAGTGGATTGGT
GCAGTTGGTTACTTAGGTGGAGGCCTTGCCTTTTCTATTATTTATGTGAAAGAAAAAGAGAATATCTACTATCCCC
TACTTGTTACATGTTAAGCAACAGCCTCTCCTTAATCATTTTAGCTATCAGTATAGTAAAATGA

25 4224.1
TTGAAAAAGCCAATTATCGAATTCAAAAACGTCCTCTAAAGTTTTTGAAGACAGCAACACCAAGGTTCTCAAAGAC
ATCAACTTTGAGTTGGAAGAAGGAAATCTACACCCTTCTAGGTGCATCTGGTTTCGGGGAAATCAACTATCCTAA
30 ACATTATTGCAGGTTTACTGGATGCGACGACAGGAGATATCATGCTAGACGGTGTTCGTATCAATGATATTCCAAC
CAACAAGCGCGACGTACATACCGTCTTCCAATCCTATGCCTTGTTCCACATATGAATGTGTTGAAAAATGTTGCC
TTTCCACTTCGCTTGCCTAAAATTGATAAGAAAGAAATCGAGCAGCGGTAGCGGAAGTTCTCAAGATGGTTCAGT
TGGAAAGGTTATGAAAAACGTTCCATCCGCAAACTTTCTGGAGGACAACGTGAGCGTGTGGCCATCGCCCGTGCTA
TCATCAACCAACCCCGTGTGGTCTTGTGAGCAGGCCTTATCAGCGCTGGACTTGAAATTGAGAACAGACATGCA
GTACGAATTGCGTGAATTACAACAACGATTGGGCATTACCTTTGTCTTTGTCACTCACGATCAGGAAGAAGCTCTT
35 GCCATGAGTGACTGGATTTTCGTTATGAATGATGGCGAGATTGTCCAGTCTGGAACCCCTGTGGACATCTACGATG
AGCCAATCAACCACTTTGTTGCCACCTTTATCGGGGAGTCAAAACATCTTGCCAGGTACCATGATTGAGGACTACTT
GGTCGAATTTAACGGCAACCGCTTTGAAGCGGTTGATGGTGGGATGAAGCCAAATGAACCTGTTGAGGTGCTTAT
TCGTCCAGAGGACTTGGCATTACCTTCTCTGAAGAAGGCAAGCTCCAAGTTAAGGTCGATACCCAGCTTTCCGT
40 GGAGTTCATTATGAAATTATCGCCTATGACGAACCTGGAAATGAATGGATGATCCACTCAACCCGTAAAGCTATCG
TGGGTGAGGAAATCGGTCTGGACTTTGAACCAGAAGACATCCACATCATGCGTCTCAATGAAACCGAAGAAGAGT
TCGATGCTCGTATTGAGGAGTACGTAGAAATCGAAGAGCAAGAAGCAGGTTTGATCAATGCAATCGAGGAGGAAA
GAGATGAAGAAAAACAAGCTCTAA

4252.1
45 ATGAAATCAATGAGAATCTTATTTTTGTTAGCTTTAATTCAAATCAGTTTGAGTAGCTGTTTCCTATGGAAGGAAT
GCATCTTGTCTTTAAACAAAGTACAGCTTTTTTCATCGGAAGCATGGTTTTTCGTTTCAGGAATCTGTGCTGGAGT
AAATTATCTTTATACCCGTAAGCAAGAAGTCCATAGTGTCTAGCCAGTAAGAAGTCGGTGAAGCTTTTTTACAGT
ATGTTACTCTTAATTAATTTGTTAGGAGCTGTTCTTGTGTTGTCAGATAACTGTTTCATCAAAAAATACGCTGCAGCA
50 AGAATTAGTTGACTTTTTATTGCCATCCTTCTTTTCTATTTGGGCTAGATTGCTGATTTTTTACCCTTGAAAAA
ATACGTGCGGATTTCTTGCTATGCTGGACAGAAAAAAGACAGTGTGGTGACTATTTTAGCAACACTTCTTTTC
TTAAGAAATCCAATGACCATTTGTCTCACTTCTGATTATATTGGACTGGGCTTGTTTTTGAGCCTATCTTGTCCC
AAATTCGGTTAAGAAGGAAGTTTCTTTTATGGTCATATTTCCGAGATCTTGATTGGTCAATTGTTACGCTCATTT
TCTTTTAG

4252.2
55 ATGGTTAAAAAAATTTGGAATGGTGCTAGCTTTACTTTCTGTAAGTGTAGTAGGAGTAGGTGTTTTGCTTATAC
TATTTATCAACAAGGGACAGAAACCTTAGCTAAAACCTATAAAAAAATCGGTGAAGAAACCAAGGTTATTGAAGC
GACTGAACCTCTAACCATTTCTGTTAATGGGAGTGGACACCGGAAATGTTGAACGAACTGAAACTTGGGTGCGTAG
AAGTGATAGCATGCTTTGATGACAGTGAATCCTAAAACGAAAAAACAACAATGATGAGTTTAGAGCGGGATAT
60 TCTGACGCGCATGTAATCAGGGAATGGTCAGGCTCATGAAGCGAAACTGAACTCAGCATATGCAGATGGTGGAGC
AGAGCTTGCTATAGAAACCATTTCAAAAAATGATGAATATCCATATTGATCGCTATGTGATGGTCAATATGAGAGG
ATTGCAAAAACTAGTGGATGCAGTAGGAGGATTACAGTCAATAATATCCTAGGTTTCCCAATTTCTATCAGTGAC
CAAGAAGAATTTAATACTATTTCTATCGGTGTTGGGGGCAACATATTGGGGGAGAAGAAGCCCTAGTCTATGCA
CGAATGCGTTACCAAGATCCTGAGGGGATTATGGTCGTCAAAAAACGTCAACGTGAAGTTATTCAAAAAGTCATG
65 GAAAAAGCTCTCAGTTTAAATAGCATTGGTCATTATCAAGAGATTCTAAAAGCTTTGAGTGACAATATGCAGACC

AATATTGATTGTCTGCAAAAAGTATCCCTAACTTGCTAGGCTATAAAGATTCATTTAAAACCATTTGAAACTCAGC
AGTTTGACGGGTGAAGGAGAGATACTTCAAGGTGTTTCTTACCAGATTGTTTCGAGAGCACATATGTTGGAAATGCA
AAATCTACTCCGACGTTCTTTGGGACAAGAAGAAGTTACTCAGCTTGAAACCAATGCGGTTTTATTTGAAGATTTA
TTTGGCAGAGCACCTGTTGGTGATGAAGATAATTA

4256.2

ATGAAAAACAAGCCTATGTCATTATTGCTCTCACCTCCTTCCTATTTGTCTTTTTTCTCCACAGCTTGCTGGA
AATACTTGATTTTGAAGGTCTATCTTTTGCACGATGTCGAAAAACAGAAAAATTTGTCTTTTATTGTTGGTTT
TCAGCATGTCCATGACCTGTCTCTTAGCCCTGTTTTGGCGAGGGATCGAAGAGCTTTCTCTAAGAAAAATGCAGGC
TAATCTCAAGCGTTTATTAGCAGGGCAAGAAGTGGTTTCAGGTTGCAGATCCAGATTGGATGCCAGTTTCAAGTCC
TTATCAGGTAAACTTAACCTTTTGACAGAGGCTCTTCAAAAAGCTGAAAAATCAGAGCCTTGCTCAGGAAGAGGAA
ATCATCGAGAAGGAACGGAAGCGAATTGCTCGGGATTGTCAGGATACAGTCAGTCAGGAGTTGTTTGGCGCCAC
ATGATTTTATCGGGTATCAGTCAGCAGGCTTTGAAATTGGATAGAGAAAAGATGCAGACCCAGTTGCAGAGTGTC
ACAGCTATTTAGAAACAGCCAGAAAGGATTGCGGGTTTTGCTCTTGCAATTTGCGACCAAGTTGAACTGGAGCAGA
AGAGCTTGATAGAAGGGATTCAAATTTCTTTAAAAGAGCTTGAGGACAAGAGTGATCTTAGGGTTAGTCTCAAGC
AGAATATGACGAAATTGCCTAAGAAAAATCGAGGAGCATATCTCCGTATCCTGCAAGAGTTGATTAGCAATACCC
TCCGCCATGCCAGGCATCTTGCTAGATGTCTACCTCTATCAGACAGATGTTGAATTGCAACTGAAGGTGGTGA
CAATGGGATTGGTTTCCAGTTAGGGAGCTTAGACGACTTGAGTTATGGAATGCGAAATATCAAGGAGCGGGTTGA
AGATATGGCTGGAACAGTTCAACTCTTGACAGCTCCCAAGCAAGGGCTGGCGGTTGATATCCGTATCCCTGTGA
GATAAGGAATGA

4263.1

ATGATTGTTTCCATTATTTCTCAAGGATTGTCTGGGCTATTCTAGGTCTGGAATCTTTATGACATTTAGGATTTT
AAACTTTCCAGATATGACGACAGAAGGTTCTTCCCTCTTGGGGGAGCTGTTGCTGTCACTTTGATAACCAAGGC
GTGAACCCATTTTTCGACACTTGTGCTGTAGGAGCAGGTTGTTGGCTGGAATGGCAGCAGGCCTTCTTTATA
CAAAAGGGAAGATCCCAACCTTGCTCTCAGGGATTGTTGGTGATGACTCTTGTCACCTCAATCATGCTCTTGATTAT
GGGACGTGCGAATTTAGGCCTGCTTGGAACCAAGCAAATTCAGGATGTTTGCCTTTTGATTGCGATTGGAATCAA
CTCTTGACAGGTCTCATCTTTGTGAGTATTGTTATTGCTCTCATGCTCTTTTCTTGACACTAACTCGGACAAGC
CTATATTGCTACAGGGGATAATCCTGATATGGCTAGAAGTTTCGGGATTCATACTGGACGCTATGGAGCTCATGGGC
TTGGTCTTATCAAATGGTGTGATTGCCCTTGCAAGGTGCCCTCATTGCTCAGCAAGAAGGTTATGCCGATGTGTCTC
GAGGATCGGGGTTATCGTTGTGGGCTTGCAAGTTTGATTATTGGAGAAGTTATTTTCAAGAGTTTGAGCTTGGC
AGAGCGTTTGGTTACTATCGTTGTAGGTTCTATCGCTTATCAATTTTTAGTGTGGGCAGTTATCGCACTTGGCTTTA
ATACAAGTTACCTTCGTTTATACAGTGCCTTGATTTTAGCAGTCTGCCTCATGATTCCAACATTTAAGCAAACAAT
CTTGAAAGGAGCCAAGTTAAGCAAATGA

4346.1

ATGAAAAAATGAAAGTTTGGTCTACTGTACTTGCAACCGGAGTTGCTCTTACTACACTTGCTGCTTGCTCTGGAG
GTTCAAATTCTACGACTGCTTCTTCATCTGAAGAAAAAGCTGATAAAAGTCAAGAATTAGTTATCTATTGAACTC
AGTCTCAAATGGTTCGTGGTGATTGGTTAACTGCTAAAGCAAAAGAAGCTGGTTTAAATATAAAAAATGGTTGATATC
GCTGGCGCTCAATTAGCAGACCGTGTATTGCTGAGAAGAATAATGCAGTTGCAGATATGGTATTTGGAATTGGTG
CTGTTGATTCAAATAAAATTAGAGATCAAAAATTACTAGTACAGTACAAGCCTAAATGGTTAGATAAAATTGATC
AATCTTTATCAGATAAAGATAATTATTATAATCGATGATTGTTCAACCATTAGTTTAAATTGGGGCGCCTGATGTA
AAAGAAATGCCTAAAGATTGGACTGAATTAGGTAGTAAGTATAAAGGTAAATATTCAATTTCTGGTCTTCAAGGA
GGTACAGGACGGGCAATTCTAGCAAGTATCTTAGTTCGATACCTTGATGATAAAGGTGAATTAGGTGTTTCCGAAA
AAGGTTGGGAAGTAGCAAAAGAATATTGAAAAAATGCATACACTCTTCAAAAGGGAGAAAGTTCAATTGTTAAGA
TGTTAGACAAAGAAGATCCAATACAATATGGAATGATGTGGGGTCTGGTGCATTAGTTGGACAAAAAGAACAAA
ATGTTGTTTCAAAGTTATGACTCCTGAGATTGGTGTACCAATTTGTAAGTGAACAACTATGGTTTAAAGCACTAG
TAAAAAACAAGCGTTAGCTAAAGAATTTATTGATTGGTTTGGTCAATCAGAAATTCAGTAGAATATAGTAAGAA
CTTTGGATCTATTCTTGCAAATAAAGATGCCCTCAAGAGATCTACCTGAAGATACGAAGAAATTTGTTGATCAAGTG
AAACCACAAAATATTGACTGGGAAGCTGTTGAAAGCATTGGATGAATGGGTAGAAAAAGCTGAATTAGAATAC
GTACAATAA

4346.2

ATGATTAAATTTGATAATATTCAAATTAATATGGTGATTTTGTGCAATTGATAATCTGAATTTAGATATACATG
AAGGGGAATTTTACATTTCTTGGGCCTTCAGGATGTGGTAAATCAACTACTTTGAGAGCATTGGTAGGTTTTCT
AGATCCATCATCAGGAAGTATTGAAGTTAATGGAACAGATGTCACTCATTGGAACTGAAAAGCGTGGAATTGG
TATTGTATTTCAATCTTATGCGCTATTTCCAACATGACTGTTTTTGATAATATTGCATTTGGTTTAAAAAGTTAAGA
AGGTAGCTCCAGATGTTATTAAGCTAAAGTATCAGCAGTGGCAGCAAAAAATTAAGATCTCTGATCAACAGTTAC
AGCGTAATGTATCAGAATTATCTGGGGTCAACAACAAAGGGTAGCATTGGCTCGTGCTGAGTTCTTGAACCTAA
AATCTTTGTGTAGATGAACCATTTGCAAACTTGACGCAAAATACGTGTAGATTGAGATAAAGAGGTTGAAAAAGA
CTTCAAAAAGAGTTAGGTATTACTTTATATGTTACTCATGATCAAGAGGAAGCCTTGACTTTATCTGATAGAA
TTGCAGTCTTAAACAATGGATACATCGAACAGGTCGATACACCAGTAGAGATTTATCATAATTCTCAAAGTGAATT
TGTATGTGATTTTATTGGAGATATTAATGTTTGAACGATGAAACAGTCCACGAAGTATTATTGAAAAATACAAGC
GTTTTCTTAGAGGATAAAAAAGGATACATTGATTAGAGAAAGTTGATTCAATCGTGAAGTGAACAAAGATTTTA
TTCTAAAAGGGACAATTATTGATGTTGAGTTTTCTGGAGTTACAATTCATATACAATAAAAGTTTTCTGAAAGTCA

GATTCTTAATGTAACAAGTATTGATAGTCAGGCTGCTATTAGATCTGTCGGAGAAAGTGGAATTATTTATCACA
CCATCAGACGTTCTGCAATTTAA

4346.3

5 ATGCGTCATAAATTAATTTAAAGATTGGCTTATTCGTTTAGGGTTAATCTGGTTCTTAGTAACATTTATTATTTA
TCCAAACTTTGATCTAGTAGTGAATGTATTTGTAAGGAGGAGAATTTCCCTTGATGCTGTACATCGTGTCTA
AAATCTCAGAGGGCACTTCAGAGTATTATGAACAGTTTAAAGTTAGCATTTTCACTCATTATTACAGTTAATGTGCG
TAGGTATTCTTTGTGTTCTATTTACAGAGTACTTTGATATTAAGGTGCTAAAAATTTAAAAATTAGGTTATATGACC
10 TCTTTAATTTATGGAGGAGTGGTTTTAGCGACTGGATATAAATTTGTCTATGGTCCTTATGGATTGATTACAAAATT
TTTACAAAATGTTATCCCTTCTTTAGACCCTAACTGGTTTATTGGGTATGGTGCAGTCTTATTCATTATGACATTTT
CAGGAACTGCTAATCATACATTGTTTTTAACAAATACAATTCGAAGCGTTGACTATCACACTATTGAGGCTGCTCG
AAATATGGGAGCAAAACCATTTACTGTTTTCCGAAAAGTAGTGTTACCAACCTTAATTCCAACCTCTATTGCACTT
ACTATTATGGTTTTTCTTAGTGGTTTATCTGCAGTAGCAGCACCCATGATTGTTGGTGGTAAAGAATTTCAAACCTAT
15 AAATCCAATGATTATTACATTTGCAGGGATGGGGAATTCTCGTGATTAGCTGCCCTACTTGCAATTATTTAGGT
ATTGCAACTACAATTTTGCTTACTATCATGAATAAGATAGAAAAAGGTGGAAATTATATTCTATCTCTAAGACTA
AAGCGCCTCTAAAAAACAAAAAATTGCGTCTAAGCCTTGGAATATCATTGCTCACATTGTAGCATATGGATTGTT
CACAGTTTTCATGCTTCCACTAATTTTATAGTATTATACTCATTTACAGATCCAGTTGCAATTCAAACAGGTAAC
TAACATTATCAAACCTTTACTTTAGAAAATTATCGCTTATTCCTTTAGTAATAGTGCGGCATTCTCTCCATTCTGGTC
20 AGCTTTATTTATTCTATTATTGCTGCGACAACAGCAACAATTCTCGCAGTTGTATTTGCTCGTGTGTCAGAAAACA
TAAATCTCGTTTTGATTCTTATTTGAATATGGTGCTCTACTTCCTTGGTTACTACCAAGTACACTTTTAGCAGTAA
GTTTATTATTTACTTTAATCAGCCACAATTTCTTGTCTTGAATCAGATTTTGGTAGGTAGTTTGGTAATTCTACTT
ATTGCATATATAGTTGTAATAATCCCATTTTCTTATAGAATGGTACGTGCTATTTATTTAGTGTTGATGATGAGAT
GGAAGATGCAGCAAGAAGTATGGGTGCTTCACCTTTTATACTATGATGAAGGTTATCATTCCATTTATTTACCG
25 GTTGTCTCTCTGTTATTGCTTTAACTTTAACTCTTTATTAACCTGACTTCGACTTATCTGTAATCCTTTACCATCCC
CTAGCTCAACCATTAGGTATTACGATTCGATCTGCAGGTGATGAAACAGCAACATCTAATGCACAAGCTCTGGTAT
TTGTTTATACAATTGTTCTGATGATTATTTCTGGAACGGTATTATACTTCACACAAAGACCGGGCGTAAAGTAAG
GAAATAA

Table 2

5 MEELVTLDCFLIDRTKIEANANKYSFVWKKTTTEKFSAKLQEIQIVYFQBEITPLLIKIAMFDKKQKRGYKESAKNLANW
HYNDKEDSYTHPDGWYRFRHHTKYQKTQTDFFQKEIKVYVYADEPESAPQKGLYMNERYNLKAKECQALLSPQGRQIF
AQRKIDVEPVFGQIKASLGKYRCNLRGKRQVRIDMGLVLMANNLLKYSKMKZ

10 MGKGHWNRKRVYSIRKFAVGACSVMIGTCAVLGGNIAGESVVYADETLITHAEKPKEEKMIVEEKADKALETKNIV
ERTEQSEPSSTEAIASEKKEDEAVTPKEEKVSAKPEEKAPRIESQASNQEKPLKEDAKAVTNEEVNQMIEDRKVDFNQ
WYFKLNANSKEAIKPADVSTWKKLDLPYDWSIFNDFHESPAQNEGGQLNGGEAWYRKTFFKLDEKDLKKNVRLTF
15 DGVMDSQVYVNGQLVGHYPNGYNQFSYDITKYLOKDGRENVIHVAVHNKQPSRWYSGSGIYRDVTLQVTDKVVH
EKNGTITLTPKLEEQHGKVETHVTSKIVNTDDKDHELVAEYQIVERGGHAVTGLVRTASRTLKAHESTSLDAILEVER
PKLWTVLNDKPALYELITRVYRDGQLVDAKKDLFGYRYHWTNPFSLNGERIKFHGVSLLHHDHGALEENYKAE
YRRLKQMKEMGVNSIRTTNHPASEQTLQIAAELGLLVQEEAFDTWYGGKKPYDYGRFFEKDATHEARKGEKWSDFD
15 LRTMVERGKNPAIFMWSIGNEIGEANGDAHSLATVTKRLVKVVDKTRVVTMGADKFRFGNGSGGHEKIADELDA
VGFNYSEDNYKALRAKHPKWLIGSETSSATRTGSSYRPERELKHSNGPERNYEQSDYGNDRVGVGKTATASWTFD
RDNAGYAGQFIWTGTDYIGEPTPWNNQNTPVKSSYFGIVDTAGIPKHDFLYQSQWVSVKKKPMVHLLPHWNWENK
ELASKVADSEKIPVRAYSNASSVELFLNGKSLGLTKFNKKQTSNGRTYQEGANANELYLEWKVAYQPGTLEAIARDES
20 GKEIARDKITTAGKPAAVRLIKEDHAIAADGKDLTYIYIEIVDSQGNVPTANNLVRFQLHGQGLVGVNDNGEQASRER
YKAQADGWSIRKAFNGKGVAVKSTEQAGKFTLTAHSDLLKSNQVTVFTGKKEGQEKTVLGTEVPKQVTIIGEAPEMPT
TVPFVYSDGSRAERPVTWSSVDVSKPGIVTVKGMADGREVEARVEVIALKSELVVKRIAPNTDLNSVDKSVSYVLIDGS
VEEYEDVKWEIAEEDKAKLAIPGSRIQATGYLEGQPIHATLVVEEGNPAAPAVPTVTVGGEAVTGLTSQKPMQYRTLA
YGAKLPEVTASAKNAAVTVLQASANGMRASIFIQPKDGGPLQTYAIQFLEEAPKIAHLSLQVEKADSLKEDQTVKLSV
25 RAHYQDGTQAVLPADKVTFTSTSGEVEAIRKGMLELHKPGAVTLNAEYEGAKDQVELTIQANTEKKIAQSIRPVNVVT
DLHQEPSLPATVTVYEDKGFPKTHKVTWQAIPEKELDSYQTFEVLGKVEGIDLEAKVSVVEGIVSVVEEVSVTPIAEAP
QLPESVRTYDSNGHVSSAKVAWDAIRPEQYAKEGVFTVNGRLEGTQLTTKLHVRVSAQTEQGANISDQWTGSELPLAF
ASDSNPSPVSNVNDKLISYNNQANRWNTNWNRTNPEASVGVLFSGILSKRSVDNLSVGFHEDHGVGVPSKSVVIEY
YVGKTVPTAPKNPSFVGNEDHVFNDSANWKPVTNLKAPAKLQKAGEMNHFSFDKVTYAVRIRMVKAENKRGTSITEV
30 QIFAKQVAAAKQGQTRIQVDGKDLANFNPDLDYIYLESVDGKVPVAVTASVSNNGLATVPSVREGEPRVIAKAENG
ILGEYRLHFTDKSLLSHKPVAAVKQARLLQVGGQALELPTKVPVYFTGKDG YETKDLTVVEEVPVPAENLTAGQFTVR
GRVLGSNLVAEITVRVTDKLGELSDNPNYDENSNAFASATNDIDKNSHDRVLDYNDGDHSENRRWTNWSPTSSNP
EVSAGVIFRENGKIVERTVTQGGKVQFFADSGTDAPSKVLRLERYVGPFEFVPTYYSNYQAYDADHPFNNPENWEAVPYR
ADKDIAAGDEINVTFAIKAKAMRWMERKADKSGVAMIEMTLAPSELPESTQSKILVDGKELADFAENRQDYQIT
35 YKQRPKVSVEENNQVASTVVDSDGSEFPVLVRLVSESGKQVKEYRIHLTKEKPVSEKTVAAVQEDLPKIEFVEKDLAY
KTVEKKDSTLYLGETRVEQEGKVGKERIFTAINPDGSKKEKREVVEVPTDRIVLVGTPVAQEAKKPVSEKADTKPID
SSEASQTNKAQLPSTGSAASQAAVAAGLTLLGLSAGLVVTKGKKEDZ

40 MKIMKKKYWTLAILFFCLFNNSVTAQEIPKNLDGNITHTQTSSESSESDEKQVDYSNKNQEEVDQNKFRIQIDKTELFVT
TDKHLEKNCKCLELEPQINNDIVNSESNNLLGEDNLDNKIKENVSHLDNRGGNIEHDKDNLESSIVRKYEWDIDKVTGG
GESYKLYSKNSKVSIAILDSGVDLQNTGLLKNLSNHSKNYVPNKG YLGKEEGEGEHSIDIQDLRGHTAVVAQVGGDN
INGVNPVHNINVRIFGKSSASPDWIVKAFDAVDDGNDIINLSTGQYLMIDGEYEDGTNDFETFLKYKKAIDYANQKGV
IIVAALGNDLSLVSNQSDLLKLISRRKKVRKPLVVDVPSYFSSITVGGIDRLGNLSDFSNKGDSDAIYAPAGSTLSSEL
GLNNFINAEKYKEDWIFSATLGGYTYLYGNSFAAPKVSGAIAIMIYKYLKDKQPYNYMFVKKFWKKHYQZ

45 MKKTWKVFLTLVLTALVAVVLVACGQGTASKDNKEAELKKVDFILDWTPNTNHTGLYVAKEKGYFKEAGVDVDLKL
PEESSDDL VINGKAPFAVYFQDYMAKKLEKGAGITAVAAIVEHNTSGHSRKSNDVSSPKDLVGKKYGTWNPTELAML
KTLVESQGGDFEKEVVPNNDSNSITPIANGVFDTAWIYYGWDGILAKSQGV DANFMYLKDYVKEFDYSPVIANND
YKDNKEEARKVIAIKKGYQYAMEHPAEAADILIKNAPELKEKRFVIESQKYLKEYASDKEK WGQFDAARWNAFY
KWDKENGILKEDLTDKGFTNEFVKZ

50 MKRTWRNSFVTNLNTPFMIGNIEIPNRTVLAPMAGVTNSAFRTIAKELGAGLVVMMEMVSDKGIQYNNKTLHMLHIDE
GENPVSIQFLGSDSLARAAEFIQENTKTDIVDINMGCPVNKIVKNEAGAMWLKDPDKIYSIINKVQSVLDIPLTVKMR
TGWADPSLAVENALAAEAAGVSALAMHGRTREQMYTGHADLETLYKVAQALTKIPFIANGDIRTVQEAQRIEEVGA
DAVMIGRAAMGNPYLFNQINHYFETGEILPDLTFEDKMKIAEYHLKRLINLKGENVAVREFRGLAPHYLRGTSGAAKL
55 RGAISQASTLAEIETLLQLEKAZ

60 MIKNPKLLTKSFLRSFAILGGVGLVIHIAIYLTFFPYIYQLEGEKFNESARVFTYELKTKTSDEIPSLLQSYSKSLTISAHLK
RDIVDKRLPLVHDLIDKGLSNYIVMLDMSVSTADGKQVTVQFVHGVVDYKEAKNILLLYLPYTFLVTAIFSFFVSFY
YTKRLLNPLFYISEVTSKMQDLDDNIRFDESARKDEVGVGKQINGMYEHLKLVIELESNEQIVKLQNKVSVFVRGAS
HELKTPLASLRILENMQHNGIDYKDHPIYAKSINKIDQMSHLLVEESSKFQEWTECRETTVKPVLDILSRYQELAH
SIGVTIENQLTDATRVVMSLRALDKVLTNLISNAIKYSKNGRVIIEQDGYLSIKNTCAPLSDQLEHLFDIFYHSQIVTD
KDESSGLGLYIVNNIESYQMDYSFLPYEHGMEFKISLZ

MYGLDLMEKAECGQFSILSFLQESQTTVKAVMEETGFSKATLTKYVTLNLDKALDSGLELAHSEDENLRLSIGAATK
GRDIRSLFLESVAVKYQILVYLLYHQFLAHQLAQELVISEATLGRHLAGLNQILSEFDLSIQNGRWGPEHQIHYFYFCL

FRKVVSSQEWEGHMQPERKQEIANLEECGASLSAGQKLDLVLWAHISQQLRVNACQFQVIEEKMGRYFDNIFYLR
 LLRKVPSSFFAGQHIPLGVEDGEMMIFFSFLLSHRILPLHTMEYILGFGGQLADLLTQLIQEMKKEELLGDYTEDHVTYEL
 SQLCAQVYLYKGYLQDRYKYQLENRHPYLLMEHDFKETAEEIFHALPAFQOGTDLDDKILWEWLQLEIYMAENGGQ
 HMRIGLDTSGFLVFSRMAAILKRYLEYNRFTIEAYDPSRHYDLLVTNNPIHKKEQTPVYLYKNDLDMEDLVAIRQLLF
 TZ

MEFSKKTRELSIKKMQERTLDLLIIGGGITGAGVALQAAASGLETGLIEMQDFAEGTSSRSTKL VHGGRLYLKQFDVEV
 VSDTVSERA VVQIAPHIPKSDPMLLPVYDEDDGATFSLFRLKVAMDLYDLLAGVSNTPAANKVLSKDQVLERQPNLKK
 EGLVGGGVYLD FRNNDARLVNIENIKRANQD GALIANHVKAEGFLFDES GKITGVVARDLLTDQVFEIKARLVINTTGPW
 SDKVRNLSNKGTFQFSQMRPTKGVHLVVDSSKIKVSQPVYFDTGLDGRMVFLPRENKTYFGTTDDTYTGDLEHPKVT
 QEDVDYLLGIVNNRFPESNITIDDISSWAGLRPLIAGNSASDYNGGNGTISDESFDNLIATVESYLSKEKTREDVESAV
 SKLESSTSEKHLDPASVSRGSSLD RRDNGLLTLAGGKITDYRKMAEGAMERVVDILKAEDRSFKLINSKTYPVSGGELN
 PANVDSEIEAFAQLGVSRGLDSKEAHYLANLYGSNAPKPVLAHSLAQAPGLSLADTSLHYAMRNELTSPVDFLLRR
 TNHMLFMRDSDLSDIVEPILDEMGRFYDWT EEEKATYRADVEAALANNDLAE LKNZ

MMNELFGFGLTLILLLGNGVVAGVVL PTKSNSG WIVITMGWGIAVAVAVFVSGKLSPAYLNP AVTIGVALKGGPL
 WASVLPYILAQFAGAMLGQILVWLQFKPHYEAENAGNILATFSTGPAIKDTVSNLISEILGT FVLVLTIFALGLYDFQA
 GIGTFAVGTLIVGIGLSLGGTTGYALNPARDLGPRIMHSILPIPNKGDGDSYAWIPVVGPIGAALAVLVFSLFZ

MTKKKIERISVIREKILWLKWFMRDKEQPKYSVLERKMFDAAKNQDMLAYQKYATIKQITDIRVQTSEADILEAVKE
 VYVYNHNMVIGACQRLFISQSPAYDKLNKWFNIYSDLYFSVVL PKMGVYHEMVGIZ

MKNSNEAEMKLLYTDIRTSLEILTREAEELVAAGKRVFYIAPNSLSFEKERA VLEYLSQASFSITVTRFAQMARYLV
 NDLPKATTLDDIGLGLAFYKCLAE LDPKDLRVYGAIKQDPQLIQQLIELYHEMTKSQMSFLDLENLTDEDKRADLLIF
 EKVTAYL NQGQLAQESQLSHLIEAIENDKVSSDFNQIALVIDGTRFS AEEERVVDLLHGKGVEIVIGAYASKKAYTSPFS
 EGNLYQASVFLHHLASKYQTPAQDCSQTHEKMSDFDKASRLLESSYDFSELALDVDEKDRENLIQWISCLTQKEEEL
 VARSIRQKLHENS DLSYKHFRILLGDVASYQLSLKTIFDQYQIPFYLGRSEAMAHPLTQFVESILALKRYRFRQEDLINL
 LRTDLYTDLQSDDIDAFEQYIRYLGINGLPAFQQTFTKSHHGKFNLERLNLVRLRILAPLETLFASRKQKAEKLLQKWSV
 FLKEGAVTKQLQDLTTTLEAVEQERQAEVWKAFCHVLEQFATVFAGSQVSLEDFLALLHSGMSLSQYRTIPATVDTVL
 VQSYDLIAPLTADFFVYAGLTQDNLPKISQNTSLTDEERQNLNQATEEGVQLLIASSEN LKKNRYTMLS LNSARKQLF
 LSAPSLFNESEKESAYLQELIHFGFRREKRMNHKGLSKEDMGSYHSLSSLVAYHQQGEMSDTEQDLTFVKVLSRVI
 GKKLDDQGLNPAIPTSPSSKTAKD TLQALYPAKQEFYLSSTSGLTFEYRNEYSYFLRYVLGLQEELRLHPDARSHGNFL
 HRIFERALQLPNEDSFDQRLEQAIQETSQEREFEAIYQESLEAQFTKEVLDDVARTTGHLRHNPAIETIKEEANFGGKDQ
 AFIQLDNGRSV FVRGKVIDRIDRLKANGAIGVVDYKSSLTQFPFHFNGLSQLPTYLAALKREGEQNF FGAMYLEMA
 BPVQSLMAVKSLAGAVVEASKSMKYQGLFLEKESSYLGEFYNNKANQLTDEEFQLLLDYNA YLYKKAEEKILAGR
 AINPYTENGRSIAPVYVQHQAITGFEANYHLGQARFLEKLDLADGKRLVGEK LKQAWLEKIREELNRZ

MKLIPFLSEEEIQKLQEA EANSSKEQKTAEQIEAIYTS AQNILVSASAGSGKTFVMAERILDQLARGVEISQLFISTFTVK
 AATELKERLEKKISKIKIETDDVDLQHLGRQLADLPNAAIGTMDSFTQKFLGKHGYLLDIAPNFRILQNQSEQLILENE
 VFHEVFEAHYQKGKETFSHLLKNFAGRGKDERGRQQVYKIYDFLQSTSNPQKWLSESLKGFKEADFTSEKEKLT
 QIKQALWDLSEFFRYHLDNDAKEFAKAAYLENVQLILDEIGSLNQESDSQAYQAVLARVVAISKEKNGRALTNASRKA
 DLKPLADAYNEERKTQFAKLQGLSDQIAILDYQERYHGD TWKLAKTFQSFMSDFVEAYRQRKQENAFEFADISHYITE
 ILENFPQVRESYQERFHEVMVDEYQDTNHIQERMLELLSNGHNRFMVGD IKQSIYRFRQADPQIFNEKFORYAQNPQEG
 RLILKENFRSSSEVL SATNDVFERLMDQEVGEIN YDNKHQLVFANTKLT PNPDNKAAFLLYDKDDTGEEESQTETKL
 TGEMRLVIKEILKLHQEKGVAFKEIALLTSSRSRNDQILLALSEYGIPVKT DGEQNNYLSQSEVQVMDLTLRVIHNPQD
 YALVALMKSPMFGFDEDELARLSLQKAEDKVHENLYEKL VNAQKMASSQKGLIHTALAEK LKQFMDILASWRLYAKT
 HSLYDLIWKIYNDRFYDYVVGALPNGPARQANLYALALRADQFEKS NFKGLSRFIRMIDQVLEAQHDLASVAVAPPKD
 AVELMTIHKSKGLEFPYVFILNMDQDFNKQDSMSEVILSRQNGLVKYIAKMETGAVEDHYPKTIKLSIPSLTYRQNEEE
 LQLASYSEQMRLLYVAMTRA EKKLYLVGKGSREKLESKEYPAAKNGKLSNTRLQARNFQDWLWAIKVF TKDKLNF
 SYRFIGEDQLTREAIGETKSPLQDSSQADNRQSDTIKEALEMLKEVEVYNTLHRAAIELPSVQTPSQIKKFYEPVMDM
 EGVEIAGQGQS VGKKSIFDLPDFSTKEKVTGAEIGSATHELMQRIDLSQQLTLASLTETLKQVQTSQAVRDKNLDKILAF
 FDTVLGQEILANTDHL YREQPFSMLKRDQKSQEDFVVRGILDGYLLYENKIVLFDYKTD RYDEPSQLVD RYRGQLALY
 EEALSRAYSIENIEKYLLLGKDEVQVVKVZ

MELARHAESLGVD AIATIPPIYFRLPEYSVAKYWN DISSAAPNTDYVIYNIPQLAGVALTPSLYTEMLKNPRVIGVNSS
 MPVQDIQT FVSLGGEDHIVFNGPDEQFLGGRLMGARAGIGGTYGAMPELFLKLNQLIADK DLETARELQYAINAIGKL
 TSAHGNMYGVIKEVLKINEGLNIGSVRSPLTPVTEEDRPVVEAAAALIRETKERFLZ

MYKTKCLREKLVFLKIFFPILYQFANY SASFVDTAMTGQYNTMDLAGVSMATSIWNPFFTFLTGIVSALVPIIHHGLG
 RGKKEEVASDFYQFIYALGLSVVLLGMVFLAPILNHNIGLEAAVAAVAVRYLWFLSIGIIPLLFSVIRSLLDSLGLTKL
 SMYLM LLLPLNSGNYLLIYGAFGVPELGGAGAGLGTSLAYWVLLGISVLVLFKQEK LKALHLEKRIPLNMDKIEGV
 RLGLPIGGTVFAEVAIFS VVGLIMAKFSPLIASHQSAMNFSSLMYAFPMSSISAMAIVSVSEVGA KRFDDAKTYIGLGRW

TALIFAFTLTFLYIFRGNVASLYGNDPKFIDLTVRFLTYSLFFQLADTFAAPLQGILRGYKDTVIPFYLGLLGYWGVAI
VYAIZ

5 MSTLAKIEALLFVAGEDGIRVRQLAELLSLPTGIQQSLGKLAQKYEKDPDSSLALIETSGAYRLVTKPQFAEILKEYSKA
PINQSLSRAALETLSIAYKPITRIEIDAIRGVNSSGALAKLQAFDLIKEDGKKEVLGRPNLYVTTDYFLDYMGINHLEEL
PVIDELEIQAQESQLFGERIEEDENQZ

10 MDTMISRFFRHLFEALKSLKRNGWMTVAAVSSVMITLTLVAIFASVIFNTAKLATDIENNVRVVVYIRKDVEDNSQTIE
KEGQTVTNNDYHKVYDSLKNMSTVKSVTFSKKEEQYEKLTEIMGDNWKIFEGDANPLYDAYIVEANTPNDVKTIAEDA
KKIEGVSEVQDGGANterLFLKASfirVWGLGIAALLIFIAVFLISNTIRITIISRSREIQIMRLVGAKNSYIRGPFLLEGAFIG
LLGAIAPSVLVFIVYQIVYQSVNKS LVGQNLMSIPDLFSPMLIALLFVIGVFIGSLGSGISMRRFLKIZ

15 MKKVRIFLALLFFLASPEGAMASDGTWQGGKQYLKEDGSQAANEWVFDTHYQSWFYIKADANYAENEWLKQGGDYF
YLKSGGYMAKSEWVEDKGAFY YLDQDGKMKRNAWVGTSYVGATGAKVIEDWVYDSQYDAWIFYIKADGQHAKEW
LQIKGKDYYFKSGGYLLTSQWQINQAYVNASGAKVQQGWLFQKQYQSWFYIKENGNYADKEWIFENGHYYYLKS
MAANEWIWDKESWFLYKFDGKMAEKWVYDSHSQAWY YFKSGGYMTANEWIWDKESWFLYKSDGKIAEKWVYD
SHSQAWY YFKSGGYMTANEWIWDKESWFLYKSDGKIAEKWVYDSHSQAWY YFKSGGYMAKNETVDGYQLGSDGK
WLGGKTTNENAA YQVVPVTANVYDSDEKLSYISQGSVWLDKDRKSDDKRLAITISGLSGYMKTEDLQALDASKD
20 FIPYYESDGHRYHYVAQNASIPVASHLSMEVGKKYYSADGLHFDGFKLENPFLFKDLTEATNYSABELDKVFSLLNI
NNLLENKGATFKEAEHYYHINALYLLAHSALSNWGRSKIAKDKNFFGITA YDTTPYLSAKTFDDVDKGILGATKWI
KENYIDRGRFTLGNKASGMNVEYASDPYWGEEKIASVMMKINEKLGKGDZ

25 MKKV LQKYWAWAFVVIPLLLQAIFFYVPMFQGAFFYSFTNWTGLTYNYKFVGLNFKLLFMDPKFMNAIGFTAIHAIAM
VVGEIALGFIARVLNSKIKGQTFRAWFFPFAVLSGLTVALIFKQVFNYGLPAIGNALHIEFFQTSLLGKWAIFA
VLLWQGVAMPPIIFLAGLQSIPTTEAARIDGATSKQVFWNIELPYLLPSVSMVFILALKGGLTAFDQVFAMTGGGPNN
ATTSLGLLVYNYAFKNNQFGYANAIAVILFLLIVVISIQLRVSKKFEIZ

30 MMKQDERKALIGKYILLILGSVLILVPLLATLFSSFKPTKDIVDNFFGFPTNFTWDFNSRLLADGIGGYWNSVVTIVLSL
LAVMIFIPMAAYSIARNMSKRKAFTIMYTLLILGIFVPFQVIMIPITVMMSKLGLANTFGLILLYTYAIPQTLFLYVGYIKI
SIPESLDEAAEIDGANQFTTYFRIIFPMMKPMHATTMIINALWFWNDFMLPLLVLNRDSKMWTPLPLFQYNYAGQYFND
YGPSFASYVVGIIITIVYLFQRHIISGMSNGAVKZ

35 MKSILQKMGEHPMLLLFLSYSTVISILAQNWMGLVASVGMFLFTIFFLHYQSILSHKFFRLILQFVLFGSVLSAFAFASLEH
FQIVKKFNAYAFSPNMQVWHQNRAEVTFNPNYYGIICFCMIAFYLF TTTKLNWLKVFCVIAAGFVNLFGLNFTQNR
AFPAAIAGAIYLF TTIKNWKAFLWSIGVFAIGLSFLSSDLGVRMGTLDSSMEERISIW DAGMALFKQNPFWGEGPLTYM
NSYPRIHAPYHEHAHSLYIDTILSYGIVGTILLVLSVAPVRLMMDMSQESGKRPIIGLYLSFLT VVAVHGFIDLALFWIQS
GFIFLLVMCSPLEHRMLVSDMTDZ

40 MSKMDVQKIIAPMMKFVNMRGIIALKDGM LAILPLTVVGSFLIMGQLPFEGLNKSIA SVFGANWTEPFMQVYSGTFAI
MGLISCFSIAYSYAKNSGVEALPAGVLSVSAFFILLRSSYIPKQGEAIGDAISKVWFGGQGIHAIIGLVVGSYITFFIKRKIV
IKMPEQVPQAIKQFEAMIPAFVIFLSSMIVYILAKSLTNGGTIFVMIYSAIQVPLQGLTGSLYGAIGIAFFISFLWVFGVH
GQSVVNGVVTALLSNLDANKAMLASANLSLENGAHIVTQQFLDSFLILSGSGITFGLVVA MLFAAKSKQYQALGKVA
45 AFAIFNVNEP VVFGFPIVMNPVMFVPFILVPVLA AVIVYGA IATGFMQPFSGVTLPWSTPAILSGFLVGGWQGVITQLVI
LAMSTLVYFPFFKVQDRLAYQNEIKQSZ

45 MKKKDLVDQLVSEIETGKVRTLGIYGHGASGKSTFAQELYQALDSTTVNLLETDPYITSGRHLVVPKDAPNQKV TASLP
VAHELES LQRDILACRRVWMSZ

50 MKKRYLVLTALLALSAAQSKEKTKNEDGETKTEQTAKADGTVGSKSQGAAQKKA EVVNKG DYYSIQGKYDEIIVAN
KHYPLSKDYNPGENPTAKAELVKLIKAMQEAGFPISDHYSGFRSYETQTKLYQDYVNQDGKAAADRY SARPGYSEHQ
GLAFDVIGTDGDLVTEEKAAQWLLDHAADYGFVVRYLKGEKETGYMAEEWHLRYVGKEAKEIAASGLSLEEYGF
EGGDYVDZ

55 MREPDFLNHFLKKGYFKKHAKAVLALSGLDSMFLFKVLSTYQKELEIELILAHVNHKQRIESD WEEKELRKLAAEAE
LPIYISNFSGEFSEARARNFRYDFFQEVMMKKTGATALVTAHADDQVETIFMRLIRGTRLRLYLSGIKEQVVGEEIIRPFL
HFQKKDFPSIFHFEDTSNQENHYFRNRIRNSYLPELEKENPRFRDAILGIGNEILDYDLAIAELSNNINVEDLQQLFSYSES
TQRVLLQTYLNRFPDLNLTAKAFAEVQQILSKSKSYRHPIKNGYELIKEYQQFQICKISPQADEKEDELVLHYQNQVAY
60 QGYLFSFGLPLEGELIQIPVSRETSIHHRKRTGDVLKNGHRKKLRRLFIDLKIPMEKRNSALHIEQFGEIVSILGIATNNL
SKKTKNDIMNTVLYIEKIDRZ

MRKFLIILLPSFLTISKVVSTEKEVVYTSKEIYYLSQSDFGIYFREKLSSPMVYGEVPVYANEDLVVESGKLT PKTSFQIT
EWRLNKQGIPIVFKLSNHQFIAADKRFLYDQSEVTPTIKKVWLESDFKLYNSPYDLKEVKSSLSAYSQVSDKTMFVEGRE
FLHIDQAGWVAKESTSEEDNRMSKVQEMLSEKYQKDSFSIYVVKQLTTGKEAGINQDEKMYAASVLKLSYLYYTQEKIN
EGLYQLD TTVKYVSAVNDFPGSYKPEGSGSLPKKEDNKEYSLKDLITKVSKESDNVAHNLLGYYISNQSDATFKSKMSA

IMGDDWDPKEKLISSKMAGKFMEAIYNQNGFVLES�TKTDFDSQRIAGVSVKVAHKIGDADEFKHDTGVVYADSPFIL
SIFTKNSDYDTISKIAKDVYEVŁKZ

5 MKKQNNGLIKNPFLWLLFIFFLVTGFQYFYSGNNSGGSSQINYTELVQEITDGNVKELTYQPNGSVIEVSGVYKNPKTSK
EETGIQFFTPSVTKVEKFTSTILPADTTVSEŁKŁATDHKAEVTVKHESSSGIWINLLVSIVPFGILFFFLFSMMGNMGGG
NGRNPMSFGRSKAKAANKEDIKVRFSDVAGAEEEKQELVEVVEFLKDPKRFTKLGARIPAGVLLGPPGTGKTLLAKA
VAGEAGVPFFSISGSDFVEMFVGASRVRSŁFEDAKKAAPAIIFIDEIDA VGRQRGVGLGGGNDEREQTŁNQLLIEMDG
FEGNEGIIIVAAATNRSDVLDPALLRPGRFDRKVLVGRPDVKGREAILKVHAKNKPLAEDVDLKLVAQQTPGFVGADLEN
10 VŁNEAALVAARRNKSIIDASDIDEAEDRVIAGPSKKDKTVSQKERELVAYHEAGHTIVGLVLSNARVVHKVTIVPRGRA
GGYMIALPKEDQMLLSKEDMKEQLAGLMGGRVABEIIFNVTQTGASNDFEQATQMARAMVTEYGMSEKŁGPVQYEG
NHAMLGAQSPQKSISEQTAYEIDEEVRSLLNEARNKAAEIIQSNRETHKLIAEALLKYETLDSTQIKALYETGKMPEAVE
EESHALSÝDEVKSKMNDEKZ

15 MKRSSLLVRMVISIFLVFLILLALVGTFYQSSSSAIEATIEGNSQTTISQTSHFİQSİYİKKLETTSTGLTQQTDLVAYAENP
SQDKVEGİRDŁFLTLKSDKDLKTVVLVTKSGQVİSTDDSVQMKTSDDMMAEDWYQKAİHQGAMPVLT PARKSDSQW
VISVTQELVDAGKANLGVLRLDISYETLEAYLNQLQŁGQGGFAFIİNNENHEFVYHPQHTVYSSSSKMEAMKPYİDTGQG
YTPGHKSİYSQEKİAGTDWTVLGVSSLEKLDQVRSQLLWTLŁGASVTSLLVCLCLVWFSLKRWİAPLKDŁRETMLİEİAS
GAQNLRAKEVGAYELREVTRQFNAMLDQİDQŁMVAİRSQEETTQYQŁQALSSQİNPFLYNTLDTIİWMAEFHDSQR
VVQVTKSLATYFRLALNQGKDLİCLSDEİNHVRQYLFİQKQRYGDKLEYEİNENVAFDNLVLPKLVQPLVENALYHGI
20 KEKEGQGHİKLSVQKQDSGLVİRİEDDGVGFDAGDSSQSŁKRGGVGLQNVĐQRLKLHFGANYHMKİDSRPQKGTKV
EİYİNRİETSZ

25 MKRSSLLVRMVISIFLVFLILLALVGTFYQSSSSAIEATIEGNSQTTISQTSHFİQSİYİKKLETTSTGLTQQTDLVAYAENP
SQDKVEGİRDŁFLTLKSDKDLKTVVLVTKSGQVİSTDDSVQMKTSDDMMAEDWYQKAİHQGAMPVLT PARKSDSQW
VISVTQELVDAGKANLGVLRLDISYETLEAYLNQLQŁGQGGFAFIİNNENHEFVYHPQHTVYSSSSKMEAMKPYİDTGQG
YTPGHKSİYSQEKİAGTDWTVLGVSSLEKLDQVRSQLLWTLŁGASVTSLLVCLCLVWFSLKRWİAPLKDŁRETMLİEİAS
GAQNLRAKEVGAYELREVTRQFNAMLDQİDQŁMVAİRSQEETTQYQŁQALSSQİNPFLYNTLDTIİWMAEFHDSQR
VVQVTKSLATYFRLALNQGKDLİCLSDEİNHVRQYLFİQKQRYGDKLEYEİNENVAFDNLVLPKLVQPLVENALYHGI
30 KEKEGQGHİKLSVQKQDSGLVİRİEDDGVGFDAGDSSQSŁKRGGVGLQNVĐQRLKLHFGANYHMKİDSRPQKGTKV
EİYİNRİETSZ

35 MFFKLLREALKVQVRSKİŁTİFİVLVFRİGTSİTVPGVNANSLNALSGLSFLNMLSLSVSGNALKNFSİFALGVSPYİTASI
VVQLLQMDİLPKFVVEWGKQGEVGRRLNQATRYİALVLAİFVQSİGİTAGFNİTLAGAQLİKTALTPQVFLTİGİİLTAGSMİ
VTWŁGEQİTDKGİYNGVSMİİFAGİVSSİPEMİQİYVDYFVNVPSSRİTSİİFVİİLİITVLLİİYFTTYVQQAİYKİPIQYTK
VAQGAİPSSSYLPLKVNİPAGVİPİFASİTAİPAİAILQFSATGHĐWAWVRVAQEMLATTSPTGİAMİYALLİİLTFFYTF
VQİNPEKAAİYTKRVİPİSMEFVLVKVQKNİCLNFFVVLQLLVPSSLVZ

40 MDIRQVTETIAMİEEQNFDİRTİTMGİSLLDCİDPDİNRİAAEKİYQKİTTKAAİNLVAVGDEİAAELGİPİVİNRVSVTPİSİLG
AATDATDYVVLAKALDKAAKEİGVDFİGGFSALVQKGİYQKGDEİLİNSİPRALAETDKVCSSVNİGSTKSGİNMİTAVAD
MGRIİKETANLSDMGVAKLVVFANAVEDNPFMAGAFHGİVEADVİİNVGVSGPGVVKRALEKVRGQSFDVVAETVKK
TAFKİTRİGQLVGOMASERLGVİFİVDLSLAPTİPAVGSİVARVLEEMGLETVGTHGTTAALALLNDQVKKGGMAC
NQVGGLSGAFİPVSEDEGMİAAVQNGSLNLEKLEAMTAİCSVGLDMİAİPEDTPAETİAAMİADEAAİGİVINMKTİAVRİİ
PKGKEGDMİEFGİLLGTAPVMKVNGASSVDİSİRGQİPAPİHSFKNZ

45 MTQİİDGKALAİKQQLAİKTAKLKEETGLVPGLVVİLVGDNPASQVYVRNERSALAİGFRSEVVRVPETİTQİEELL
DLİAKYNQDPAWHGİLVQPLPKHİDEEAVLLAİPEKDVDGFHPLNMGRŁWSGHİPVMİPSTPAGİMEMFHEYGİDİLEG
KNVAVVİGRSNİVGKPMQLLAKNATVTŁTHSRTHNLSKVAİKADİLVVAİGRAKFVTADİFVKPGAVVİDVGMNRDEN
GKŁCGDVĐYEAVAPLASHİTPVPGVGPMİTİMLMEQTYQAALRTŁDRKZ

50 MSKNRİHLVLDİSVGİGAİPDANİFNAGVPDİGASDTŁGHİSKTVGLNVPNMAİKİGLNİPRETPŁKTVAİESNPTGY
ATKLEEVSLGKDTMTGHWEİMGLNİTEPFDTFİWNGİFPEİİLTKİEEİFSGRKVİREANKPYSGTAVİYDFGPRQMETGELİİ
YTSADPVLQİAAHEDİİPLDELİRİCEYARSİTLERİPALLGRİİARPYVGEİPNFTRTANRRDLAVSPFFPTVLDKŁNEAGİ
DTYAVGKİDİFNAGİNHDMGHİKSİNSHGİDŁTLKTMLAEFEKGİFSFTNLVDFDALYGHRRNAHGYRDCŁHEFDE
55 RLPEİİAAMRENDLLİTADHGNDPTİYAGTDHTREYİPLLAYSPAFKNGİLPVGHİFADİSATVADNİFGVETAMİGESFL
DKLVZ

60 MFİSİSAGİVTFLŁTLVEİPAFİQFYRKQİTİGQMHEDVKQHQAİAGTPTMGGLVFLİTSVLVAFFİFALFSSQFSNNVGM
İLFİLVLVGLVGLDĐFLKVFRKİNEGLNPKQKŁALQŁLGİVİFYLFYERGGDİLSVFGYPVHLGFFYİFFALFWLVGFSN
AVNŁTDGVĐGLASİSVİLSAYGİVAYVQGMĐİLLVİLAMİGGLGFFİFNHKPAKVFMGDVGSŁALGGMLAİSMA
LHQEWTLİİGİVYVFETTSVMQVSİYKLTGGKRFRTMPVHHHİFELGGLSGKGNPWSEWKVĐFFFWGVGLLASLLT
LAILYLMZ

65 LFKKNKDLNİALPAMGENFLQMLMGMVĐSYLVAHLGLİAİSGVSVAGNİTİYQAFİFALGAAİSSVİSKİSGKQKĐQSKLA
YHVTEALKİTLLSFLGFLSİFAGKEMİGŁLGTİRDVAESGGLYLSLVGGSİVLLGLMTSLGALİRATHNPRİPLVVSFL
SNALNİLFSSLAİFVLDMGİAGVAGTİVSRLVGLVİLSQKLPYKİPTFGŁDKELLTLALPAAGERLMMRAGDVVİİA

LVVSFGTEAVAGNAIGEVLTQFNYPMPAFGVATATVMLLARAVGEDDWKRVASLSKQTFWLSLFLMLPLSFSIYVLGVPL
LTHLYTTDSLAVEASVLVTLFSLGTPMTTGTVIYTAVWQGLGNARLPFYATSIGMWCI RIGTYLMGIVLGWGLPGIW
AGSLLDNGFRWLFLRYRYQRYMSLKGZ

MQTQEKHSQAAVLGLQHLLAMYSGSILVPIMIATALGYSAEQLTYLSTDFMCGVATFLQLQLNKYFGIGLPPVVLGVA
 FQSPVALPIMIGQSHSGAMFGLIASGIVVLVSGIFSKVAMPNLFPSVITGVSVTITGLTLPVAINGMGNVNPEPTGQSLLLA
 AITVLILLINIFTKGFIKSISILGLVVGTAIAATMGLVDFSPVAVAPLVHVPTLPYFGMPTFEISSIVMMCIATVSMVST
 GYVLALSDITKDPIDSTRLRNGYRAEGLAVLLGGIFNTFPYTGFSONVGLVKLSGIKKRLPIYYAAGFLVLLGLLPKFGA
 LAQIIPSSVLGGAMLVFMFGFVSIQGMQILARVDFANNEHFLIAAVSIAAGVGLNNSNLFVSMPTAFQMFFSNGIVVASL
 LAIVNLAVNLHKKKZ

MKDRIKEYLQDKGKVTVNDLAQALGKDSSKDFRELIKTSLMERKHQIRFEEDGSLTLEIKKKHEITLKGIFHAHKNNGF
 FVSLEGEEDDLVFGKNDVNYAIDGDTVEVVIKVVADRNGKTAAGAEIKIIDLHSLTITVVGQIVLDQKPKYAGYIRSN
 QKISQIYVKKPALKLEGTVEVLKVFIDKPSKKHDFVAVLDVVGHTDVGIDVLEVLESMIDVSEFFPAVVKAEASVP
 DAPSQKDMEGRLDLRDEITFTIDGADAKDLDDAVHIKALKNGNLEFGVHIADVSYVYVTEGSALDKALNRATSVYVTD
 RVVPMPLPERLSNGICSINPQVDRLTQSAIMEIDKHGRVVNYTITQTVIKTSFRMTYSDVNDILAGDEEKREYHKVIVSSIE
 LMAKLHETLBNMRVKRGALENDFTNEAKILVDQKGPVDIVLRQGIARMIESFMFLMANETVAEHFSKLDLDPFYIRIHE
 EPKAEKVQKFIDYASSFGLRIYGTASEISQEALQDIMRAVEGEYADVLMSMLLRSMQQARYSEHNHGHYGLAADYYT
 HFTSPIRRYPDLLVHRMIRDYGRSKEIAEHFEQVIEPIATQSSNRERRAIEAEREVEAMKKAEMYMEEYVEEYDAVSSIV
 KFGLFVELPNTVEGLIHITNLPFYHFNERDLTLRGEKSGITFRVGOQIRIVERADKMTGEIDFSVPSEFVIEKGLKQS
 SRSRGRDSNRRSDKKEDKRKSGRSDNDRKHSQDKDKKKGGKPPYKEVAKKGAKHGKGRGKGRRTKZ

MGTTGFTIIDLILIVYLLAVLVAGIYFSKKEMKGKEFFKGDGSPWPVYVTSVSIFATMLSPISFLGLAGSSYAGSWILWFA
QLGMVVVAIPLTIRFILPFIARIDIDTA YDYLDRFNSKALRIISALFIHYQLGRMSIIMYLPAGLSVLTDGINILILMGVV
AIVSYTGGKLSVLWTFDIQGVILISGVVLAFLFVLIANIKKGFGGVAETLANGFLAAEKNLFDPNLLNSIFILVMGSGF
TILSSYASSQDQLVQRFTTQNIKKLNKMLFTNGVLSLATATVFYLGITGLYVFYQVQNADSAASNIPQDQIFMYFIAYQL
PVGITGLILAAIYAAQSQTISTGKNSVATSWTLDIQDVISKNMDSNRRTKIAQFVSLAVGLFSIGVSIVMAHSDIKSA YEFW
NSFMGLVLGLLGGVFIILGSKANKQGA YAAIVSTIVMVFIKYFLPPTAVSYWAYSLSISVSVSGYIVSVLTGNKVS
APKYTTIHDIDEIKADSSWEVRHZ

MKFSSKKYIAAGSAVIVLSLCAYALNQHRSQENKDNRRVSVYDGSQSSQKSENLTDPQVSVQKEGIQAEQIVIKITDQGYV
 TSHGDDHYHYNGKVPYDALFSEELLMKDPNYQLKDADIVNEKVGYYIKVDGKYIYVYLKDAAHADNVRTKDEINRQK
 QEHVKDNEKVSNSNAVARSQGRYTYNDGQVFNPAIDIETGNAVIVPHGGHYHYPKSDLSASELA AAKAHLAGKNM
 QHSVYSSTASDNDNTQSAVAGSGTSKPANKSENLSQLLKEYDPSPAQRYSSEDGLVDFDPAKIIISRTPNGVAIPHGDHYHF
 IPYSKLSALEEKIARMVPISGTGSTVSTNAKPNEVSVSLGSLSSNPSSLTTSKELSSASDGYIFNPKDIVEETATAYIVRHGD
 HFHYIPKSNQIGOPTLPNNSLATPSPSLPINPGTSHKEHEEDGYGF DANRIIAEDES GFVMSHGDHNNHYFFKKDLTEEQIK
 VRKNIZ

MKKRAIVAVIVLLLIGLDQLVKSIVYQQIPLGEVRSWIPNFVSLTYLQNRGAASFILQDQQLLFAVITLVVVIGAIWYLHK
 HMEDSFWMVLGLTLIIAGGLGNFIDRVSQGFVDMFHLDLFINAIFNVADSYLTVGVIIILLIAMLKKEINGNZ

MNTNLFASFIVGLIINDENRFFYFVQKDGQTYALAKEEGQHTVGDTVKGFAYTDMKQKRLRLTTLEVATATQDQFGWGRVT
EVRKDLGFVFDVTGLPDKEIVVSLDLPELKEWPKKGDQLYIRLEVDDKDRIWGLLAYQEDFQRLARPAYNNMQNQ
WPAIVYRLKLSGTFVYLPENMLKGFHPSERYAEPRLGQVLDARVIGFREVDRTNLNLSLKPRSFMELENDQAQMLTYL
NNGSFMFTLNDKSSPDDIKATFGISKQGFKKALGGMLKAGKIKDQDQFGTELIZ

MKDVSFLFLKKVFKSRLNWIVLALFVSVLGVTFYLSQTSANSHSLESRLSRIAANERAINENEEKLSQMSDTSSEYQF
 AKNNLDVQKNLLTRKTEILLKEGRWKEAYYLQWQDEEKNYEFVSNPTASPLKMGVDREKRYQALYPLNIKAH
 TLEFPHGQIDQIVWLEVIIPSLFVVAIIFMLTQLFAERYQNHLDTAHLYPVSKVTFAISSLGVGVGYVTVFLGICGFSFLV
 GLSISFGGLDYPPIYSLVNQVETGIQIQDVLFPGLLLAFLAFIVIEVYLYIAFFYKQMPVFLVGLSIGIVGLLFGIQTIQP
 LQRIHLIPFTYLRVSEILSGRLPKQIDNVLDNWSMGMVLLPCLIIFFLLGLFIERWGSSQKKEFFNRFZ

MMKFILDIVSTPAILVALIAILGLVLQKKKLPDIHGGIKTFVGFVLVSGGAGIVQNSLNPFGTMEFAHFLSGVVPNNEAI
VALQTYTGSATAMIMFAGMVFNILAIRTRFKYIFLTGHHTLYMACMAIVLVSAGFTSLPILLLGGLAIGMISIPAF
VQKYMYQLTGNDKVLGLGHFSSLQYWLSGFTGSLIGDKSSTEDIKPKMAFLRDLSTVSITLSMAVIHVIIVAFAGSEYIEK
EISSGTSGLVYALQLAGQFAAGVFVILAGVRLILGEIVPAFKGISERLVPNSKPALDCPIVYTYAPNAVLIGFISSFVGGLV
MVIMIASGFTVVILPGVVPHFFCGATAGVIGNASGGVRGATIGAFQLGILISFLVFLMLPVLGGLGFQGSFTSDADFGLSGII
LGMILNOFGSOGAGIVIGLVLILAMVFGVSFIKKPSATEEZ

MIKTFLSALSILFSIPIITYSFFPSSNLNIWLSTQPILAQIYAFPLATATMAAILSFLFFLSFYKKNKQIRFYSYGILLLSLIL
LLFGDTKLSSASNKTKTLKLVTNVNAVQIEAQHIERIFSHFDADMAIFPELATNIRGEQENQRIKLLFHQVGLSMANYD
IFTSPTNSGIAPVTIVVKKSYGFYTEAKTFHTTRFGTIVLHSRKQNPIDIALHTAPPLPGLMEIWQDQLNIHNQLASKYP
KAIAGDFNATMRHGALAKISSHRDALNALPPFERGTWNSQSPKLFNATIDHILLPKNHYYVKDLDIVSFQNSDHRCIFT
EITFZ

5 MNPIQRSWAYVSRKRLRSFILFLILLVLLAGISACLTLMKSNKTVESNLKSLNTSFSIKKIENGQTFKLSDLASVSKIKGL
 ENVSPLETVAKLKDEAVTGEQSVERRDLSAADNNLVSLTALEDSSKDVTFTSSAFNLKEGRHLQKGDSSKILHEEL
 AKKNGLSLHDKIGLDAGQSESGKGQTVFEFIIHIFSGKKQEKFTGLSSDFSENQVFTDYESSQTLNNGNSEAQVSAARFYVE
 NPKEMDGLMKQVENLALENQGYQVEKENKAPEQIKDSVATFQFTLTIFYGMLIAGAGALILVLSLWLRERVYEVGIL
 LALGKGKSSIFLQFCLEVVLVSLGALLPAFVAGNAITTYLLQTLASGDQASLQDTLAKASSLSTSILSFAESYVFLVLLS
 CLSVALCFLFLFRKSPKEILSSISZ

10 MLHNAFAYVTRKFFKSIVIFLIILLMASLSLVGLSIKGATAKASQETFKNITNSFSMQINRRVNNQGTFRGAGNIKGEDIKKI
 TENKAIESYVKRINAIGDLTGVDLIETPETKKNLTADRAKRFSSLMITGVNDSSKEDKFVSGSYKLVEGEHLTNDKDK
 ILLHKDLAAKHGWKVGDVKVLDSDNIYDADNEKGAKETVEVTIKGLFDGHNKSAVTYSQELYENTAITDIHTAAKLYGY
 TEDTAIYGDATFFVTADKNLDDVMKELNGISGINWKSYYTLVKSSSNYPALQESISGMYKMANLLFWGSLFSFVLLALL
 LSLWINARRKEVGILLSIGLKQASILGQFITESILIAIPALVSAYFLANYTARAIGNTVLANVTSGVAKQASKAAQASNLLG
 GAEVDGFSKTLSSLDISQTSDFIIFVLALVLVLMALASSNLLRKQPKELLLDGEZ

15 MSQDKQMKAVSPLLQRVINISSIVGGVGLSIFCIWAYQAGILQSKETLSAFIQQAGIWGPPLFIFLQILQTVVPIPGALTSV
 AGVFIYGHIIGTIYNYIGIVIGCAIIFYLVRLYGAAVQSVVSKRTYDKYIDWLDKGNRFRFFIFMMIWPIPADFLCMLA
 ALTKMSFKRYMTIHLTKPFTLVVYTYGLTYIIDFFWQMLZ

20 MRNMWVVIKETYLRHVESWSFFFMVISPFLLGLISVGIGHLQGSMAKNNKVAVVTTVPSVAEGLKNVNGVNFYKDE
 ASAKEAIKEEKLKGYLTIDQEDSVLKAVYHGETSLENGIKFEVTGTLNELQNQLNRSTASLSQEKEKRLAQTIQFTEKIDE
 AKENKKFIQTIAAGALGFFLYMILITYAGVTAQEVASEKGTKIMEVVFSSIRASHYFYARMMALFLVILTHIGIYVVGGL
 AAVLLFKDLPFLAQSGILDHLGDAISLNTLLFILISLFMYVVLAAFLGSMVSRPEDSGKALSPLMILIMGGFFGVLTALGAA
 GDNLLLKIGSYIPFISTFFMPFRTINDYAGGAEAWISLAITVIFAVVATGFIGRMYASLVLTDDLGWTKFKRALSZYKZ

25 MTETIKLMAKHTSVRRFKEQEIPQVDLNEILTAAQMASSWKNFQSYSVIVVRSQEKDALYELVPQEAIRQSAVFLLFV
 GDLNRAEKGARLHTDTFQPQGVGELLISSVDAALAGQNALLAAESLGYGGVIIGLVRYKSEEVAEFLNLPDYTSVFG
 MALGVPNQHHDMKPRLPLENNVFEIEYQEOSTEAIQAYDRVQADYAGARATTSWSQRLAEQFGQAEPSSSTRKNLEQK
 KLLZMLKLLIAIVGTNSKRSTNRQLLQYMQKHFTDKAEIELVEIKAIPVFNKPADKQVPAEILEIAAKIEADGVIIPTPEYD
 30 HSIAPVLSALAWLSYGIYPLLNKPMITGASYGTGSSRAQLQLRQILNAPEIKANVLPDEFLLSHSLQAFNPSSGDLVDL
 DVIKKLDIAIFDDFRIFVKITEKLRNAQELLRKDAEDFDWENLZ

35 MNTYQLNNGVEIPVLGFGTFKAKDGEEAYRAVLEALKAGYRHIDTAAIYQNEESVQGAIKDSGVPREEMFVTTKLWNS
 QQTYEQTRQALEKSIEKLGLDYLDLYLHWPNNPKPLRENDWAKTRNAEVRAMEDLYQEGKIRAIGVSNFLPHLDAL
 LETATVPAVNQVRLAPGVYQDQVVAAYCREKGILLEAWGPFQGELEFDSKQVQEIAANHGKSVAQIALAWSLAEGFLP
 LPKSVTTSRIQANLDCFGIELSHEERETLKTIAVQSGAPRVDDVDFZ

40 MRCKMLDPIAIQLGLPAIRWYALCIVTGLILAVYLTMEAPRKKIIPDDILDILVAFPLAILGARLYYVIFRFDYYSQNLG
 EIFAIWNGGLAIYGGITGALVLYIFADRKLINTWDFLDIAAPSVMIAQSLGRWGNFFNQEAYGATVDNLDYLPGFIRDQ
 MYIEGSYRQPTFLYESLWNLLGFALLIFRRKWKSLRRGHITAFYLIWYGFGRMVIEGMRTDLSMFFGFRVSWLSVVL
 GLGIMIVIYQNRKKAPYYITEENZ

45 MGKLSILLGTVSGAALALFLTSKKGKQVCSQAQDFLDDLREDPEYAKEQVCEKLETVKEQATDFVLKTKEQVESGEIT
 VDSILAQTKSYAFQATEASKNQLNNLKEQWQEKAEALDDSEIIVIDITEEZ

50 MKTKLIFWGSMLFLLSLSILLTIYLAWIFYPMEIQWLNLTNRVYLKPETIQYNFHLNMNYLTNPFSQVLQMPDFRSSAAG
 LHHFAVVKNLFLHVLQVALVTLPSFYVFNRIKDKDFSLYRKSLLALVVLPMIGLGGVLIGFDQFFTLFHQILFVGD
 DTWLFDPADKDPVIMILPETFFLHAFLLFFALYENFFGYLYLKSRRKZ

55 MTYHFTEEYDIIVIGAGHAGVEASLAASRMGCKVLLATINIEMLAFMPCNPSIGGSAKGIVVREVDALGGEMAKTIDKT
 YIQMKMLNTGKGPVVRALRAQADKELYSKEMRKTVENQENLTLRQTMIDEILVEDGKVVGVRTATHQEYAAKAVIVT
 TGTALRGEIIGDLKYSSGPNHSLASINLADNLKELGLEIGRFTGTTPRVKASSINYDVTEIQPGDEVNPHFSYTSRDEDY
 VKDQVPCWLTYYTNGTSHEIIQNNLHRAPMFTGVVKGVPYRCPYCSIEDKIVRFADKERHQLFLEPEGRNTEEVYVQGLST
 SLPEDVQRDLVHSIKGLENAEMMRTGYAIEYDMVLPQLRATLETKKISGLFTAGQNTGTSYEEAAGQGIIAGINAAL
 60 KIQKPELILKRSDDGYIGVMIDDLVTKGTIEPYRLTSRAEYRLILRHDNADMRLTEMGREIGLVDDERWARFEIKKNQF
 DNEMKRLDSIKLKPVKETNAKVEEMGFKPLTDAVTAKEFLRPEVSYQDVVAFIGPAAEDLDDKIIELIETIEIKYEGYISK
 AMDQVAKMKRMEEKRIPANIDWDDISIAEARQKFKLINPETIGQASRISGVNPADISILMVYLEGKNRSISKTLQSKSZ

65 MTKQVLLVDDEEHILKLLDYHLSKEGFSTQLVTNGRKALALAETEPDFILLDIMLPQLDGMVEVCKRLRAKGVKTPIM
 MVSAKSDEFKVLALGLGADDYLTGPFSPRELLARVKAVALRRTKGEQEGDSDNIADDSWLFGLTKVYPERHEVYKA
 NKLLSLTPKEFESDKNPFVEVFKVSKVTAQZ

65 MTTFKDGFLWGGAVAAHQLEGGWQEGGKGISVADVMTAGRHGVAAREITLGVLEGKYYPNHEAIDFYHRYKEDIALF
 AEMGFKCFRTSIAWTRIFPKGDELEPNEEGLQFYDNLFDECLNGIEPVITLSHFEMPYHLVTEYGGWKNRKLIDFFARF
 AEVVFVKRYKDKVKYWMFTFNEINNQANYQEDFAPFTNSGIVYEEGDNREAIMYQAAHYELVASARAVKIGHEINPDFQI

5 GCMIAMCPIYPVTCNPKDILMAMKAMQKRYFADVHVLGKYPEHIFKYWERKGISVDFTAQDKEDLLGGTVDYIGFS
YYMSFAIDSHRENNPYFDYLETEDLVKNNYVKASEWEWQIDPEGLRYALNWFTDHYHLPLFVENGFGAIDQVAADG
MVHDDYRIEYLGAHIREMKAVVEDGVDLMGYTPWGCIDLVSAGTGEMRKRYGFIYVDKDDNGKGSYNRSPKKSFG
WYKEVISSNGESVEZ

10 MDQQNGLFGFLENHVMGPMGKLAQFKVVRITAAGMAAVPFTIVGSMFLVFSILPQAFSFWPIVADIFSASFDKFTSLY
MVANYATMGSLSLYFVLSLAYELTKIYAEEEEELNMNPLNGALLALMAFVMTVPQIIFDGGMMKTVTSLKEGAVIADG
WAMGNVVARFGTTGIFTAIIMAIVTVLIYRMCVKHNWVIKMPAEVPEGVSRGFTALVPGFVAVFVIFINGLLVAMGT
DIFKVIAPFGFVSNLTSNWIGLMIYLLTQLLWIVGIHGANIVFAFVSPIALANMAENAAGGHFAVAGEFSNMFVIAGGS
GATLGLCLYIAFASKSEQKAIGRASVVPALFNINEPLIFGLPIIYNPALAIPFILAPMVTATIIYVANSNFIKPIAQVPWP
TPVGIGAFGLTADLRAVLVALVCAFAAFVLYLPFIRVYDQKLKVEEQGIZ

15 MKKFYVSPFIPILVGLIAFGVLSTFIIFVNNNLLTVLILFLFVGGYVFLFKKL RVHYTRSDVEQIQYVNHQAEESLTALLEQ
MPVGVMLNLSSGEVWFNPAELILTKEDGDFDLEAVQTIKASVGNPSTYAKLGEKRYAVHMDASSGVLYFVDVSR
EQAITDELVTSRPVIGIVSDNYDDLEDETSESDISQINSFVANFISEFSEKHMMSRRVSMDFLYFTDYTVLEGLMNDK
FSVIDAFREESKQRQLPLTSLMGFSYGDGNHDEIGKVALNLNLAEVRGGDQVVKENDETKNPVYFGGSAASIKRT
RTRTRAMMTAISDKIRSVDQVVFVGHKNLDMALGSAVGMQLFASNVIENSALYDEEQMSPDIERAVSFIEKEGVTK
20 LLSVKDAMGMVTVNRSLLILVDHSKTALTSKEFYDLFTQTIVIDHRRDQDFPDNAVITYIESGASSASELVTETIQFQNS
KKNRLSRMQASVLMAGMMLDTKNFTSRVTSRTFDVASYLRTGRSDSIAIQEIAATDFEYREVNELILQGRKLGSVDLI
AEAKDMKCYDTVVISKAADAMLAAMSGIEASFVLAKNTQGFISARSRSKLNQVRIMEELGGGGHFNLAQAQIKDVTLS
EAGEKLTIVLNMKEKEKEEZ

25 MKEKNMWKELLNRAGWILVFLAVLLYQVPLVVTSTILTKEVALLQSGLIVAGLSIVVLALFIMGARKTKLASFNFSFF
RAKDLARLGLSYLVIVGSNILGSILLQLSNETTTANQSQINDMVQNSSLISSFFLLALLAPICEILCRGIVPKKIFRGKENL
GFVVGTVFALLHQSNLPSLLIYGGMSTVLSWTA YKTQRLEMSILLHMIVNGIAFCLLALVVMISRTLGISVZ

30 MKEKNMWKELLNRAGWILVFLAVLLYQVPLVVTSTILTKEVALLQSGLIVAGLSIVVLALFIMGARKTKLASFNFSFF
RAKDLARLGLSYLVIVGSNILGSILLQLSNETTTANQSQINDMVQNSSLISSFFLLALLAPICEILCRGIVPKKIFRGKENL
GFVVGTVFALLHQSNLPSLLIYGGMSTVLSWTA YKTQRLEMSILLHMIVNGIAFCLLALVVMISRTLGISVZ

35 MDTQKIEAAVKMIEAVGEDANREGLQETPARVARMYQEIFSGLGQTABEHLKSFEIIDDNMVVEKDIFFHTMCEHHF
LPFYGRAHAIYPDGRVAGLSKLARTVEVYSKKPQIQLNIEVADALMDYLGAKGAFVIEAEHMCMSMRGVKPGT
ATLTTVARGLFETDKDLRDQAYRLMGLZMKDLFLKRKQAFRKECLGYLRYVLNDHFVFLFLLVLLGFLAYQYSQLLQH
FPENHWPIILLFVGITSVLLLLWGGTATYMEAPDKLFLLVGEEIKLHLKRTGISLVFWLFFVQTLFLLFAPLFLAMGY
GLPVFLLYVLLLVGKGFYHFCQKASKFFTETGLDWDYVISQESKRQVLLRFFALFTQVKGISNSVKRRAYLDFILKAV
QKVPKIQWQNLVYLSYLRNGDLFALSRLLLSLLAQVFIEQAWIATAVVVLFNYLLFQLLALYHAFDYQYLTQLFPL
DKGQKEKGLQEVVRGLTSFVLLVELLVGLTFQEKLALLALLGAGLVLLVLYLPYQVKRQMQDZ

40 MRKSIVLAADNAYLIPLLETTIKSVLYHNRDVFYILNSDIAPEWFKLLGRKMEVNVNSTIRSVHIDKELFESYKTGPHINYA
SYFRFFATEVVESDRVLYLDSDIIVTGELATLFEIDLKGSIGAVDDVYAYEGRKSGFNTGMMLMDVAKWKEHSIVNSL
LELAEEQNVVHLGDQDSILNIYFEDNWLALDKTYNMYMGIDYHHLAQECERLDDNPPTIVHYASHDKPWNTYSISRLRE
LWWWYRDLDWSEIAFORSDLNIFERSNQSKQVMLVTSADIKHLEYLVQRLPDWHFHLAAPCDCSEELTSLSQYTN
45 VTVYQNVLHSRIDWLLDDSIYLDINTGGEVFNVTTRAQESGKKIFAFDITRKSMDGGLYDGIFSVERPDDLVD RMKNI
EIEZ

50 MTKIYSSIAVKKGLFTSFLLFIYVLGSRILPFVDLNTKDFLGGSTAYLAFSAALTGGNLRSLSIFSIVGLSPWMSAMILWQ
MFSFSKRLGLTSTIEIQDRRKMYLTLIIAIVQSLAVSLRPLVQSSYSAILVVLMTILLIAGTFFLVWLSDLNASMGIGGSI
VILLSSMVLNIPQDVLTFQTVHIPTGIIVLLALLTLVFSYLLALMYRARYLVPVKNIGLHNRFKRYSYLEIMLNPAAGMP
YMYVMSFLSVPAYLFILLGFIPNHSLAALSKEFMVGKPLWVYVYISVLFVLSIIFAFVTMNGEBEADRMKKSGEYIYGI
YPGADTSRFINRLVLRFSVIGGLFNVIMAGGPMLFVLFDEKLLRLAMIPGLFMMFGGMIFTIRDEVKALRLNETYRPLIZ

55 MSSLSQDELVAKTVEFRQRLSEGESLDDILVEAFVVRREADKRILGMFPYDVQVMGAIVMHYGNVAEMNTGEGKTLT
ATMPVYLNAFSGEGVMVVTNPNEYLSKRDAEEMGVYRFLGLTIGVPFTEDPKKEMKAEKKLIYASDIITYTNSNLGFD
YLNDNLASNEEGKFLRPFNYVIDEIDDILDSAQTPLIAGSPRVQSNYYAIDTLVTLVEGEDYIFKEEKEEVWLTTKG
AKSAENFLGIDNLYKEEHASFAHLYVAIRAHKLFTKDKDYIIRGNEMVLVDKGTGRLEMMENTKLGGLHQAEAKEHV
KLSPETRAMASITYQSLFKMFNKISGMTGTGKVAEKEFIETYNMSVVRIPTRPRQRIDYPDNLITLPEKVYASLEYIKQ
YHAKGNPLLVFVGSVEMSQLYSSLLFREGIAHNVLNANNAAREAQIIESGQMGAVTVATSMAGRGTDIKLGKGV AEL
60 GGLVIGTERMESQRIDLQIRGRSGRQGDPMGSKFFVSLDEDDVIKKFGPSWVHKKYKDYQVQDMTQPEVLKGRKYRKL
VEKAQHASDSAGRSARRQTLEYAESMNIQRDIVYKERNRLIDGSRDLEDVVVDIERYTEEVAAHDYASRELLHFHIVTN
ISFHVKEVPDYIDVTDKTAVRSFMKQVIDKELSEKKELLNQHDLYEQFLRLSLLKAIDDNWVEQVDYLQQLSMAIGGQS
ASQKNPIVEYYQEAAYAGFEAMKEQIHADMVRNLLMGLVEVTPKGEIVTHFPZ

65 MIGTFAAALVAVLANFIVPIETPNSANTEIAPPDGIGQVLSNLLKLVDNPNVALLTANYIRILSWAVIFGIAMREASKNS
QELLKTIADVTSKIVEWIINLAPFGILGLVFKTISDKGVGSLANYGILLVLLVTTMLFVAPVNVNPLIAFFFMRRNPYPLVW

NCLRVSGVTAFFTRSSATNIPVNMKCHDLGLNPDTYSVSIPLGSTINMAGVAITINLLTAAVNTLGIPVDFATAFVLSV
VAAISSCDASGIAGGSLLLIPVACSLFGISNDIAIQVGVGVFVIGVQDSCETALNSSTDVLFATAVEAAYAATTRKKZ

- 5 MSISQRTTKLILATCLACLLAYFLNLSSAVSAGIALLSLSDTRRSTLKLARNRFLSMLLALAIGVLAFLHSGFHIWSGLY
LAFYVPLAYKMGWEIGTPSTVLVSHLLVQESTSPDLLVNEFLLFAIGTGFAALLVNL YMPSREEEIQHYHTLVEEKLKDI
LQRFKYYSRGDGRNRAQLVAELDTLLKEALRLVYLDHSDHLFHQTDYHIHYFEMRQRQSRILRNMAQQINTCHLAAS
ESLILAQLFSKIAGQLSQTNPASDLLDEIERYLEVFRNRSLPKTREEFETRATLLQLLREAKTFIQVKVDFYQKYRQZ
- 10 MEIMSLAIAVFAVIIGLVIGYVSISAKMKSSQEAELMLLNAEQEATNLRGQAEREADLLVNEAKRESKSLKKEALLEAK
EEARKYREEVDAEFKSERQELKQIESRLTERATSLDRKDDNLTLSKEQTLEQKEQSDRAKNLDAREEQLEEVERQKEAE
LERIGALSQAEARDIILAQTEENLTREIASRIREAEQEVKERSDKMAKDILVQAMQRIAGEYVAESTNSTVHLPDDTMKG
RIIGREGRNIRTFESLTGVDVVIDDTPEVVTLSGDFPIRREIARMTMEMLLKDGRIHPARIEELVEKNRQEIDNKIREYGEA
AAEIGAPNLHPDLMKIMGRLOFRTSYQGNVLRHSIEVAKLAGIMASELGENAALARRAGFLHDIGKAIDHEVEGSHVE
15 IGMELARKYKEPPVVVNTIASHHGDVEAESVIAVIVAADALSAAARPGARSESLESYIKRLHDLLEEIANGFEGVQTSFAL
QAGREIRIMVNPGRKIKDDKVITLAHKVRKKIENNLDYPGNIKVTVIRELRAVDYAKZ
- MMLKPSIDTLLDKVPSKYSVLVLEAKRAHELEAGAPATQGFSEKSTLRALIEESGNVTIHPDPEGKREAVRRRIEEKKR
RKEEEKKIKEQIAKEKEDGEKIZ
- 20 MSAYQLPTVWQDEASNQGAFTGLNRPTAGARFEQNLPKGEQAFQLYSLGTPNGVKVTILLEELLEAGFKEAAYDLYKI
AIMDGDQFGSDFVKLNPNSKIPALLDQSGTENVRVFESAHIILYLAEKFGAFLPSNPVEKVEVLNWLFWQAGAAPFLG
GGFGHFFNYAPEKLEYPINRFTMEVKRQLDLLKELAQKPYIAGNDYTIADIAIWSWYQGLVQGNLYQGSAKFLDASS
YQNLVKWAELIANRPAVKRGLEVITYTEIKZ
- 25 LASLITSIMFYVGFVLDRLDTIQKILSREETVIDPLGATLGIISAIMFVVYLYNTRLSKKSNSNALKAAAADNLSDAVTS
GTAAILASSFNYPVDKLVAMITFFILKTAIDIFIESSFLSDGDFDRLLLEDYQKAIMEIPKISKVKSQRGRITYGSNIYLDIT
LEMNPDLSVFESHEIADQVESMLEERFGVFDTDVHIEPAPIPEDEILDNVYKLLMREQLIDQGNQLEELLTDFFVYIRQ
DGEQMDKEAYKTKKELNSAIKDIQITSISQKTKLCICYELDGIHSTIWRRHETWQNIHQETKKEZ
- 30 MTIKLVATDMDGTFLDGNRFRMDRLKSLLSVYKEKGIYFAVASGRGFLSLEKLFAGVRDDIIFIAENGSLVEYQGGDL
YEATMSRDFYLATFEKLTSPYVDINKLLTGKKGSYVLDTVDETYLKVSQHYNENIQKVASLEDITDDIFKFTTNFTTE
TLEDGEAWVNENVPGVKAMTTGFESIDIVLDYVDKGVAIVELVKKLGITMDQVMAFGDNLNDLHMMQVVGHPVAPE
NARPEILELAKTVIGHHKERSVIA YMEGLZ
- 35 MADIKLIALDLDTLLTDDKRLTDRKETLQAARDRGKVVLTGRPLKAMDDFFLHELGTDDGEDEYTTITFNGGLVQK
NTGEILDKTVFSYDDVARLYEETEKLSLPLDAISEGTVYQIQSDQESLYAKFNPALTFVPVDFEDLSSQMTYNKCVTAF
QEPLDAAIQKISPELFDQYEIFKSREMILLEWSPKNVHKATGLAKLISHLGIDQSQVMACGDEANDLSMIEWAGLGAM
QNAVPEVKAAANVTPMTNDEEAVAWAIEEYVLKENZ
- 40 MESLILLILLIANLAGLFLIWQRQDRQEKHLSKSLEDQADHLSQDLDRYFDQARQASQLDQKDLEVVSVDRLQEVRIELH
QGLTQVRQEMTDNLLQTRDKTDQRLQALQESNEQRLQEQMRQTVEEKLEKTLQTRLQASFETVSKQLESVNRGLGEMQ
TVARDVGALNKVLSGTGTRGILGELQLGQIIEDIMTPAQYEREYATVENSSERVEYAIKLPQGGDQYVYLPIDSKFFLA
DYRLEEAYETGDKDEIERCRKSLASVKRFARDIRNKYIAPPRTTNFGVLFVPTGLYSEIVRNPVFFDRLRREEQIIV
45 GPSTLSALLNSLSVGFKTLNIQKSADHISKTLASVKTEFGKFGGILVKAQKHLQHASGNIDELNRRITAIERTLRHIELSE
GEPALDLLHFQENEEYEDZ
- MKISHMKKDELFEFGYLIKSADLRQTRAGKNYLAFTFQDSDGEIDGKLWDAQPHNIEAFTAGKVHMKGRREVYNNT
PQVNQITLRLPQAGEPNPADFKVKSPPVDVKEIRDYMSQMIFKIENPVWQIRVNL YTKYDKEFYSPAAKTNHHAFT
50 GLAYHTATMVRLADAISEVYPQLNKSLLYAGIMLHDLAKVIELTGPDQTEYTVRGNLLGHIALIDSEITKTVMELGIDDT
KEEVVLLRHVILSHHGLEYGSPVRPRIMEAEIHHMIDNLDASMMMSTALALVDKGEMTNKIFAMDNRSFYKPDLDZ
- MSEKAKKGFKMPSSYTVLLIIIAIMAVLTWFIAGAFIEGIYETQPQNPQGIWDVLMAPIRAMLGTHPEEGSLIKETSA
VAFFILMVGGFLGIVNKTGALDVGIASIVKKYKGREKMLILVLMPLFALGGTTYGMGEETMAFYPLLVPVMMAVGFD
55 LTGVAILLGSQIGCLASTLNPATGFIASATAGVGTGDGIVLRLIFWVTLTALSTWVYRYADKIQKDPTKSLVYSTRKE
LKHFNVEESSVESTLSKKQKSVLFLVLTFILMVLSFIPWTDLGVTIFDDFNTWLTGLPVIGNIVGSSSALGTWYFPEG
AMLFAFMGILIGVYGLKEDKIISSFMNGAADLLSVALIVAARGIQQVIMNDGMITDTILNWGKEGLSGLSSQVFIVVTYIF
YLPMSFLIPSSSGLASATMGIMAPLGEFVNRPSLIITAYQSASGVNLNLIAPTSIGVIMGALALGRINIGTWWKFMGKLVVA
IIVVTIALLLLTGTFPLZ
- 60 MSNSFVKLLVSQFLANLADIFFRVTHIANIYHKSIVIATSLVPILIGISSFVASLLVPLVTKRLALNRVLSLSQFGKTILLAIL
VGMFTVMQSVAPLVTYLFFVAISILDGFAAPVSYAIVPRYATDLGKANSALSMTGEAVQLIGWGLGGLLFATIGLLPTT
CINLVLYISSFLMLFLPNAEVEVLESETNLEILLKGWKLVARNPRLRFVSAANLEIFSNITWVSSIILVFVTELLNKTES
WGYSNTAYSIGIIISGLIAFRLSEKFLAAKWEPLFTPNLKTIONPCSLDPGWFLFSPNGCFLDKKEFPYLYGISVEKNTK
65 RKETHMNSLPNHFFQKNSFYQLSFDGGHLLTQYGGLIFFQELFSQLKLERISKYLVTNDQRRYCRYSDSILVQFLFQLL

TGYGTDYACKELSADAYFPKLEGGQLASQPTLSRFLSRTDEETVHSLRCLNLELVEFFLQFHQLNQLIVDIDSTHFTTY
GKQEGVAYNAHYRAHGYPHYAFEGKTGYCFNAQLRPGNRYCSEEDSFITPVLERFNQLFRMDSGFATPKLYDLIE
KTGQYYLIKLLKKNVLSRLGDLSPCPQDEDLTILPHSAYSETLYQAGSWSHKRRVCQFSEKKEGNLFYDVISLVNMTS
GTSQDQFQLYRGRGQAENFIKEMKEGFFGDKTDSSTLIKNEVRMMMSCIAYNLVFLKHLAGGDFQTLTIKRFHFL
HVVGKCVRTGRKQLKLSSLYAYSELFALYSRIRKVNLNLPVPEPPRRKASLMMHZ

MMEFFQQLPHLEPYGNPQYFVYVIAATLPIFIGLFFKKRFAWYEVLSLFFIVTMLVGGKTNQLAALGIYLCWEILLFL
YKHRYKSKDGKWVLYLVSLSLPIIFVKVQPAINGTQSLLGFLGISYLTFRSVGIVIELRDGVKIDFTLWEFLRFLFMP
FSSGPIDRFKRFNENYQAIPERDELMDMLDESVRIMWGFLYKFIHAHVLGETLLPPLKNLALQSGGFNLYALAVMYT
FGLELFFDFAGYSMFALAINLMGIRSPINFNKPLSRDLKEFWNRWHMSLSFWFRDFVFMRMVMVLTRKKVFKNRN
VTSSMAYIVNMLIMGFHWGVTWYIAYGLFHGLGLVINDAWVRKKKTLNKKERKKAGKAALPENRWIQLLGMVVTFH
VVMLSFLIFSGFLNNLWFKKZ

MLKRLWMIFGPVLIAGLLVFLLIFFYPTMHHNLGAEKRSAAVATTIDSKERSQKVRALSDPNVRFVPPFGSSEWLRF
GAHPAVLAEKYNSRYPYLLGQGAASLNQYFGMQMLPQLENKQVYVISPQWFSKNGYDPAAFQYFNGDQLTS
FLKHQSGDQASQYAAATRLQFPNVAMKDLVQKLASKEELSTADNEMIELLARFNERQASFFGQFSVRGYVNYDKHV
AKYLKILPDQFSYQAIEDVVKADAENKTSNNEMGMENYFYNEQIKKDLKLLKDSQKSFTYKKSPEYNDLQLVLTQFSK
SKVNPFIIPPVNKKWMNYAGLREDMYQQTQVQKIRYQLESQGFNTIADFSKDGGEPPFMKDTIHLGWLGWLAFDKAVD
PFLSNPTPAPTYHLNERFFSKDWATYDGDVKEFQZ

MEKNLKALKQTTDQEGPAIEPEKAEDTKTVQNGYFEDAADVCDRTLSDYAGNWQSVYPFLEDGTFDQVFDYKAKLTG
KMTQAEYKAYYTKGYHTDVTKINITDNTMEFVQGGQSKKYTYKYVGKKILTYKKGNRGVRFLFEATDADAGQFKYV
QFSDHNVAAPVKAEHFHIFFGGTSQEALFEEMDNWPTYYPDNLSGQEIQAQEMLAHZ

MKDGHLAHHRLLNNGRIFQKLLSQDPEALYRGEQGGKILAVLWNSSETGCATATDIALATGLANNTLTMIKKLEEQL
VIVSPCGKDKRKKYLVLTELKGSQKEVGHRSQKLDITFYKGFSEBIEHQFEGFQERILANLKEKGNEVZ

MTNLIATFQDRFSDWLTALSQHLQSLTLLAILLAIPAVFLRYHEKLAADWVLQIAGIFQITIPSLALLGLFIPLMGIGTL
PALTALVIYAIFPILQNTITGLKGIDPNLQEAAGFMTRWERLKKFEIPLAMPVIMSGIRTAALVLIIGTATLAALIGAGGL
GSFILLGIDRNNASLILIGALSSAVLAIAFNFLKVMKAKLRTIFSGFALVALLGLSYSPALLVQKEKENLVIAGKIGPEP
EILANMYKLLIEENTSMTATVKPNFGKTSFLYEALKKGDIDYIPEFTGTVTESLLQSPKVSHEPEQVYQVARDGIAKQD
HLAYLKPMYSYQNTYAVAVPKKIAQEYGLKTISDLKKVEGQLKAGFTLEFNDREDGNKGLQSMYGLNLNVATIEPALRY
QAIQSGDIQITDAYSTDAELERYDLQVLEDDKQLFPPYQAGAPLMKEALLKKHPELERVNLNTLAGKITESQMSQLNYQVG
VEGKSAKQVAKEFLQEGLLKKZ

MMHTYLQKKIENIKTTLGEMSGGYRRMVAAMADLGFSGTMKAIWDDLFAHRSFAQWIYLLVLGSPFLWLELVYEHRI
VDWIGMICSLTGICVIFVSEGRASNYLFLGINSVIYLLALQKGFYGEVLTTLTYFTVMQPIGLLVWIYQAQFKKEKQEFV
ARKLDGKGWTKYLSISVLWLAFGFIYQSIGANRPYRDSITDATNGVGQILMTAVYREQWIFWAATNVFSIYLWWGES
LQIQGKYLIYLNLSLVGWYQWSKAAQNTDLLNZ

MRNMKAKYAVVWAFFLNLYAIVEFIAGGVFGSSAVLADSVHDLGDAIAIGISAFLETISNREEDNQYTLGYKRFSLG
ALVTAVILVTGSLVILENVTKILHPQPVNDEGILWLGIIAITINLLASLVVGKGTKNESILSLHFLEDTLGWVAVILMAI
VLRFTDWYILDPLLSLVISFFILSKALPRFWSTLKIFLDAVPEGLDIKQVKSGLERLDNVASLNQLNLWTMDALEKNAIV
HVCLKEMEHMETCKESIRIFLKDCGFQNTIEIDADLETHQTHKRKVCDLERSYEHQHZ

MIEYKNVALRYTEKDVLRDVLNQIEDGEFVMVLVGPSSGSKTTMLKMINRLLEPTDGNIMYMDGKRIKDYDERELRLSTG
YVLQAIALFPNLTVAENIALIPEMKGSKEEITKKTEELLAKVGLPVAEYGHRLPSELSSGGEQQRVGVIVRAMIGQPKIFL
MDEPFALDAISRKQLQVLTKEHLKEFGMTTIFVTHDTDEALKLADRIAQLDGEIRQVANPETILKAPATDFVADLFG
GSVHDZ

MSAVAISAMTKVMQETHGNPSSIHGHRQAGKLLREARQELAQLLRTKPOHIFFTSGGTEGNNTTHIGYCLRHQEQGKH
IITTAIEHHAVLETIDYLVQHFGEATHIQPENQEITAQQIQKALRDDTILVSTMFVNNETGNLLPIAEIGQILKQHPAAHY
VDAVQAIGKIPHSEELGIDFLTASAHKFGHPKGIGFLYASSMDFSYLHGGDQEQKKRAGTENLPAIVGMVAALKEDL
EKQEEHFQHVQNLETAFLAELEGIQYYLNRGKHHLPYVLNIGFPGQKNDLLRLDLAGISISTGSACTAGVVQSSHVLE
AMYGANSERLKESLRISLSPQNTVEDLQTLAKTLKEIIGGZ

MLFKLSKEKIELGLSRLSPARRIFLSFALVILLGSLLSLFPVQVESSRATYFDHLFTAASAVCVTGLSTLPVAHTYNIWG
QIICLLIQIGGLGLMTFIGVFIYQSKQKLSLRSRATIQDSFSYGETSLRKFFVYSIFLTFLVESLGAILLSFRLIPQLGWGR
GLFSSIFLAISAFCNAGFDNLGSTSLFAPQTDLLVNLVIAGLIITGGLGFMVWFDLAGHVGRKKKGRHLHFHTKLVLVLLTI
GLLLFGTATTFLFEWNNAGTIGNLPVADKVLVSSFQTVTMRTAGFSTIDYTAHPVTLLIYILQMFLGGAPGGTAGGLK
ITTFVLLVFARSELLGLPHANVARRTIAPRTVQKSFSVFIIFLMSFILLGLITAKGNPPFIHLVFETISALSTVGVTANL
TPDLGLKALSVIMPLMFMRIGPLTLFVSLADYHPEKKDMIHYMKADISIGZ

MSDRITGILGLGIFGSSVLAALAKQDMNIIAIDDHAERINQFEPVLARGVIGDITDEELLRSAGIDTCDTVVVATGENLESS
VLAVMHCKSLGVPTVIKVKSQTAKKVLEKIGADSVISPEYEMGQSLAQTLFHNSVDVFQLDKNVSIVEMKIPQSWAG
QSLSKLDLRGKYNLNLGFRQENSPLDVEFGPDDLKADTYILAVINNQYLDTLVALNSZ

5

MKLLSIAISSYNAAAYLHYCVESLVIGGEQVGILIINDGSQDQTQIEAECLASKYPNIVRAIYQENKCHGGAVNRGLVEAS
GRYFKVVDSDDWDPRAYLKILETLQELESKGQEVDFVTNFVYEKEGQSRKKSMSYDSVLPVRQIFGWDQVGNFSK
QQYTMHSLIYRTDLLRASQFZ

10

MKFNPQNRYTRWSIRRLSVGVASVVVASGFFVLVGQPSSVRADGLNPTPGQVLPEETSGTKEGDLSEKPGDVTLTQAKP
EGVTGNTNSLPTPTERTEVSEETSPSSLDTLFEKDEEAQKNPELTDVLKETVDTADVDGTQASPAETTPQVKGGVKEN
TKDSIDVPAAYLEKAEGKGPFTAGVNVIPYELFAGDGMRLRLKASDNAPWSDNGTAKNPALPPLEGLTKGKYFYE
VDLNGNTVGKQGGALIDQLRANGTQTYKATVKVYGNKDGKADLTNLVATKNVDININGLVAKETVQKAVADNVKDS
IDVPAAYLEKAKGEGPFTAGVNVHPIYELFAGDGMRLRLKASDKAPWSDNGDAKNPALSPLGENVTKKGQYFYQV
ALDGNVAGKEKQALIDQFRANGTQTYSATVNVYGNKDGKPDLDNIVATKKVTININGLISKETVQKAVADNVKDSIDV
PAAYLEKAKGEGPFTAGVNVHPIYELFAGDGMRLRLKASDKAPWSDNGDAKNPALSPLGENVTKKGQYFYQLALD
GNVAGKEKQALIDQFRANGTQTYSATVNVYGNKDGKPDLDNIVATKKVTININGLISKETVQKAVADNVKTVSMFQQP
TZ

15

20

25

MKLKSYILVGYIISTLLTILVFWAVQKMLIAKGEIYFLLGMTIVASLVGAGISLFLLLPVFTSLGKLKEHAKRVAAKDFP
SNLEVQGPVEFQQLGQTFNEMSHDLQVSFDSLEESEREKGLMIAQLSHDIKTPTSIAQATVEGILDGIIKESEQAHYLATIG
RQTERLNKLVEELNFTLNTARNQVETTSKDSIFLDKLLIECMSEFQFLIEQERRDVHLQVIPESARIEGDYAKLSRILVN
LVDNAFKYSAPGKTLEVVAKLEKDQLSISVTDEGQGIAPEDLENIFKRLYRVETSRNMKTGGHGLGLAIARELAHQLG
EITVSSQYGLGSTFTLVLNLGSENKAZ

30

MFGQTAQHGLTNSLKDWFIFLLNIGPQLAFFCQMLRCSRSVEQGTGNHRRREFNMIQQIFSHFGMTHLGQIKLVYQESID
LELLVNALNHHLLIDRLVLTNPQITIEIDRQIVHGLDLLKGRKDKKEIIDKSMFRQLELASTQQICPINQRVHHGILAFGEIS
DLVPAKNLPNRQDZ

35

MEHLATYFSTYGGAFFAALGIVLAVGLSGMGSA YGVGKAGQSA AALLKEQPEKFASALILQLLPGTQGLYGFVIGILIW
LQLTPELPLEKGVA YFFVALPIAVGYFSAKHQGNVAVAGMQILAKRPKEFMKGAILAAMVETYAILAFVVSFILTLRVZ

40

MLKSEKQSRYOMLNEELSFLLEGETNVLANLSNASALIKSRFPNTVFAGFYLFDGKELVLGPFQGGVSCIRIALGKGV
GEAAHFQETVIVGDVTTYLNLYISCDLAKSEIVPMMKNGQLLGVLDLDSSEIEDYDAMDRDYLEQFVAILLEKTAWD
FTMFEEKSZ

45

MSVLEIKDLHVEIEGKEILKGVNLTLTGTGEIAAIMGPNGTGKSTLSAAIMGNPNYEVTKGEVLFDGVNILELEVDERAR
MGLFLAMQYPSEIPGITNAEFLRAAMNAGKEDDEKISVREFITKLDEKMELLMKEEMAERYLNEGFSGGEKKRNEIL
QLLMLEPTFALLDEIDSGLDIDALKVVSXGVNAMRGEGFGAMIITHYQRLNLYITPDVVHVMMEGRVVLSGGPELAAR
LEREGYAKLAEELGYDYKEELZ

50

MPYKRQSFMSMALSKLDSLYMAVVADHSKNPHHQKLEDAEQISLNNPTCGDVINLSVKFDAEDRLEDIAFLNSGCTIS
TASASMMTDAVLGKTKQEILELATIFSEMVGQKDERQDQLGDA AFLSGVAKFPQRIKCATLAWNALKKTIENTQEKQZ

55

MKIQDLLRKDVMLLDLQATEKTAVIDEMIKNLTDHGYVTDFTFKEGILAREALTSTGLGDGIAMPHSKNAAVKEATV
LFAKSNKGVDES LDGQATDLFFMIAAPEGANDTHLAAALAE LSQYLMKDG FADKL RQATSADQVIELFDQASEKTEEL
VQAPANDSGDFIVAVTACTTGIAHTYMAQEALQKVA AEMGVGKIVETNGASGVGNQLTAEDIRKAKAIIAADKAVEM
DRFDGKPLINRPVADGIRKTEELINLALSGDTEVYRAANGAKAATASNEKQSLGGALYKHLMSGVQMLPFFVIGGIMI
ALAFIDGALGVPNENLGNLGSYHELASMFMKIGGAAGFLMLPVFAGYVAYSIAEKPLVAGFVAGAIAGEGFAFGKIP
YAAGGEATSTLAGVSSGFLGALVGGFIAGALVLAIKKYVKVPRSLEGAKSILLPLLGITLTGFVMLAVNIPMAAINTAM
NDFLGGGLGGGSAVLLGIVLGGMMAVDMGGPVNKAAYVFGTGTLAATVSSGGSVAMAAVMAGGMVPLAIFVATLLF
KDKFTKEERNGLTNIIMGLSFITEGAIPFGAADPARAIPSFILGSAVAGGLVGLTGIKLMA PHGGIFVIALTSNALLYLVS
VLVGAIVSGVVYGYLRKPQAZ

60

65

MANKNTSTTRRRPSKAELERKEAIQRMLISLGIAILLIFA AFKLGAAGITLYNLIRLLVGS LAYLAIFGLLIYLF FFKWIRK
QEGLLSGFFTIFAGLLLIFEAYLVWKYGLDKSVLKG TMAQVVTDLTGFR TTSFAGGGLIGVALYIPTAFLFSNIGTYFIGS

ILILVGSLLVSPWSVYDIAEFFSRGFAKWEGHERRKEERFVKQEEKARQKAEKEARLEQEETEKALLDLPPVDMETGE
 ILTEEA VQNLPPPIEEKWVEPEILPQAE LKFPEQEDDSDDDEDVQVDFSAKEALEYKLP SLQLFAPDKPKDQSKKKIVRE
 NIKILEATFASFGIKVTVERA EIGPSVTKYEVKPAVGVRVNRISNLSDDLALALAAKDVRIEAPIPGKSLIGIEVPNSDIATV
 5 SFRELWEQSQTKAENFLEIPLGKAVNGTARAFDLSKMPHLLVAGSTGSGKSVAVNGIIASILMKARPDQVKFMMVDPK
 MVELSVYNDIPHLLIPVVTNPRKASKALQKVVDENRYELFAKVGVRNIAGFNAKVEEFNSQSEYKQIPLPFIVVIVDE
 LADLMMVASKEVEDAIIRLGQKARAAAGIHMLATQRPSVDVISGLIKANVPSRVAFVSSGTDSTRILTDENGAEKLLGRG
 DMLFKPIDENHPVRLQGSFISDDDDVERIVNFIKTQADADYDESDFDPGEVSENEGEFSDDGAGGDPLFEEAKSLVIETQKA
 SASMIQRRLSVGFNRATRLMEELEIAGVIGPAEGTKPRKVLQOZ

MSYFKKYKFDKSQFKLGMRTFKTGIAVFLVLLIFGFFGWKGLQIGALTAVFSLRESFDES VHFGTSRILGNSIGGLYALV
 FFLNNTFFHEAFVWTLVVVPICMTLMTNVAMNNKAGVIGGVAAMLITLSIPSGETILYV FVRVLETFMGVFVAIIVN
 YDIDRIRLFLEKKEKZ

MNKSEHRHQLIRALITKNKIHTQAE LQALLAENDIQVTQATLSRDIKNMNL SKVREEDSAYYVLNNGSISKWEKRLELY
 MEDALVWMRPVQHQLVLLKTLPLGLAQSFSGIHTLSFPDAIATLCGNDVCLICEDADTAQKCFEELKKFAPPPFFEEZ

MKSIKLNALSYMGRVNLNIIPILTGTYYARVLDRTDYGFNSVDITLSFFLPFATYGVYNYGLRAISNVKDNKKDLNRT
 FSSLFYLCTACTILTAVYILAYPLFFT DNPIVKKVYLV MGIQLIAQIFSIEWVNEALENYSFLFYKTAFIRILMLVSIFLVK
 NEHDIVVYTLVMSLSTLNYLISYFWIKRDIKLVKIHLSDFKPLFLPLTAMLVFANANMLFTFLDRLFLVKTGIDVNVSY
 YTIAQRIVTVIAGVVTGAIGVSVPRLSYYLGKGDKEAYVSLVNRGSRIFNFFIPLSFGLMVLGPNAILLYGSEKYGIGGIL
 25 TSLFAFRITILALDITLGSQILFTNGYEKRITVYTVFAGLLNLGLNSLLFFNHIVAPEYYLLTTMLSETSLLVFYIIFHRKQL
 IHLGHIFSYYRYSLSFVAIYFLIN FVYPVDMVINLPFLINTGLIVLLSAISYISLLVFTKDSIFYEFLNHVLALKNKFKK
 SZ

MELFMKITNYEIKLKKSGLTNQILK VLEYGENVDQELLLGDIADISGCRNPVFMERYFQIDDAHLSKEFQKFPFSFIL
 DDCCYPWDLSEIYDAPVLLFYKGNL DLLKFPKVA VVGSRACSKQGA KSVEKVIQGLENELVIVSGLAKGIDTAAHMAAL
 QNGGKTIAVIGTGLDVFPKANKRLQDYIGNDHLV LSEYGPGEQPLKFHFPARNRIIAGLCRGVIVAEAKMRSGSLITCE
 RAMEEGRDVFAIPGSILDGLSDGCHHLIQEGAKLVTSGQDVLA EFEFZ

MKQLTVEDAKQIELEILDYIDITLCKKHNNIYNYGT LIGAVRHEGFIPWDDDDIDLSMPREDYQRFINIFQKEKSKYKLLS
 LETDKNYFNFIKITDSTTKIIDTRNTKTYESGIFIDIFIDRFDDPKVIDTCYKLESFKLLSFSKHKNNIVYKDSLLKDWIRT
 AFWLLRPVSPRYFANKIEKEIQYSRENGQYMAFIPSKFKEKEVFPSGTFDKTIDLPFENLSLPAPEKFDITLTQFYGDY
 MTLPPEEKRFYSHEFHAYKLEDZ

MIKINHLTITQNKDLRDLVSDLTMTIQDGEKVAIIGEEGNGKSTLLKILMGEALSDFTIKGNIQSDYQSLAYIPQKVPEDL
 KKKTLHDYFFLDSIDLDSILYRLAEELHFD SNRFASDQEIGNLSGGEALKIQLIHELAKPFEILFLDEPSNDLDLETVDW
 LKGQIQKTRQTVIFISHDEDFLSETADTIVHLRLVKHRKEAETLVEHLDYDSYSEQRKANFAKQSQAANNQRAYDKT
 MEKHRRVKQNVETALRATKDS TAGRLAKMKTVLSQEKRYEKAASMTQKPLEEEQIQLFFSDIQLPASKVLVQLE
 45 KENLSIDDRVLVQKLQTLVRGQEKIGIIGPNGVGKSTLLAKLQRLNDKREISLGFMPODYHKKQLDLSPIAYLSKTGE
 KEELQKIQSHLASLNFSPMQHQIRSLSGGQGGKLLLLDLVLRKPNFLLDEPTRNFSPTSQPIRKL FATYPGGLITVS
 HRRRFLKEVCSIIYRMTEHGLKLVNLEDLZ

MKPKTFYNLLAEQNLPLSDQKEQFERYFELLVEWNEKINLTAITDKEEVY LKHFYDSIAPILQGLIPNETIKLLDIGAGA
 GFPSLPMKILYPELDVTIISLNRINFLQLLAQELDLNGVHFYHGRAEDFAQDKNFRAQYDFVTARAVARMQVLSLT
 IPYLKVGKLLALKASNAPEELLEAKNALNLLFSKVEDNLSYALPNRDPRIYTVVEKKETPNKYPRKAGMPNKRPLZ

MSIKLIAVDIDGTLVNSQKEITPEVFSAIQDAKEAGVKVVIATGRPIAGVAKLLDDLQLRDEGDYVYVTFNGALVQETATG
 HEIISESLTYEDYLDMEFLSRKLGVMHHAITKDGIYTANRNIGKYTVHESTLVSMPIFYRTPEEMAGKEIVKCMFIDEPEI
 LDAAEIKPAEFYERY SINKSAPFYELLLKKNVDKGS AITHLAELKGLTKDETMAIGDEENDRAMLEVVGPNVVMENG
 PEIKKIAKYITKTNDESGVAHAIRTWVLZ

MTWIIILGVALIVIFIVSYNGLVKNRMQTKEAWSQIDVQLKRRNDLLPNLIETVKGYAKYEGSTLEKVAELRNQVAAA
 TSPA EAMKASDALTRQVSGIFAVAESYDPLKASANFVKLQEELTNTENKISYRQLYNSVVSNNVVKLETFFSNIIAGMF
 GFKAADFLQTPEEEKSVPKVDFSGLDGZ

MLFDDQIASNKRKRWILLVFFLLALVGYAVGYLFIRSLGGLVIALIIGFIYALSMIFQSTEIVMSMNGAREVDEQAPD
LYHVVEDMALVAQIPMPRVFIIDDPALNAFATGNSNPQNEAAVATSGLLIAMNREEALVAVMGHEVSHIRNYDIRISTIAV
ALASAITMLSSMAGRMWVGAGRRRSDDDRDNGLEIIMLVSVLLAIVLALPLAATVQLAIRSQREFLADASSVELT
RNPQGMINALDKLDNSKPMRSRHVDDASSALYINDPKKGGGFQKLFYTHPPISERIERLKQMZ

MKLNIQEIRKQSEGLNFEQTLDDLVDLRLARNQEILDVVKDILAVGVQVYEDRMYFLDYQLSYTIVLASSRSMPELVES
 YPVTVEFMEGATNQLDQEVLDDDLVLPIENGELDLAESVSDNILLNIPKVLTAEEEAGQGFISGNDWQIMTEEEYQAQ
 KAVKKEENSPFAGLQGLFDGDEZ

MKRQLALVVFSGGQDSTTCFLWVMQHYETVEAVTFAYGQRHHLEIQITREIAKEQGIRHHILDMSSLGQITAQPDFATI
 HISYIPDKLCVESKSLKLYLSYRNHGFHENCINTIGKDLVNLDPYLEVWGKFTPRGGISIDPYNYNGKQGTKYEGL
 AEQRLFQHDLYPEKIDNRZ

MTTETVEDKVSHSITGLDILKGIVAAGAVISGTVATQTKVFTNESAVLEKTVKTDALATNDTVVLGTISTSNSASSTLSA
SEASSTASASASTASASTASASTASASTASASTVSGSQAAATEAKKVEEDRKPKPADSYVDSVNTVNLQSYA
KRRKRSVDSIEQLLASIKNAAVFSNGTIVNGAPAINASLNKSETKVTYTGEGVDVSVRPVPIYKKLVNTDNKLTFYTY
VTYVNPKTNDLGNISSMRPGYSIYNSGTSTQTMLTLGSDLGKPSGVKNYITDKNGRQVLSYNTSTMTTQSGGYTWGNC
AQMGFFAKKGYGLTSSWTVPIGTDTSTFTPTPYAARTDRIGINYFNGGKKVVESTTSQSLSQKSLSVASQSASASAS
TSASASASTSASASASTSASASASTSASVASTSASASASTSASASASTSASASASTSASASASTSASASASTSASE
SASTSASASASTSASEASTSASASASTSASASASTSASGSASTSTASASTSASASASTSASASASISASEASTSASEASTST
SASASTSASEASTSASASASTSASASASTSASASASTSASASTSASEASTSASASASTSASASASTSASASASTSASTS
ASVSASTSASASASTSASASASTSASEASTSASASASTSASASASTSASASTSASEASTSASEASTSASEASTSASASA
STASASASTSASGSASTSTASASTSASASASTSASASASISASEASTSASEASTSTASASTSASEASTSASEASTSASASA
SASTSASASARQVRRPQPVLNRHQVPRQPQVLVHQLQHQRVHRLQHQPVPRLQROPVRLQQPVPVLQSQHQQLVQ
PQHRQVPRLQQAQHQLNRQRAPQLQVQVPVRQPRRQVPRQPQVLVHQLQHQRVHRLQRVHQSQVPRVLPHQ
QVPRQLQAPVRLQLQVLAPOPQPQVPRQPQVQSRLNRHQVRPRLQVLAPQPQRQVHRLQRQRVRLNRHQVRPRL
QQVLAPQPQRQVHRLQHQRVRLQVQLAPQPQRQVHRLQRQRVRLSQHQRVRLQVQLAPQPQRQVHRLQHQRVRLQV
APQLQVQVPRQPQRQVRLQLQVQVPRQPQVQVPRQPQRQVRRPQPVLNRHQVPRQPQVQLVHQLQHQRVHRLQH
QPVHQSQVQVPRQPRINKCLGFSKYZ

MGVETWFYSSICWLAIGLGSVWKFPYMTAANGGGGFLFLISTILIGFPLLAEFALGRSAGVSAIKTFGKLGKNNKYN
FIGWIGAFALLFILLSFYVIGVWVLVYLGIEFGKLFQGGTGYAQLFTSISINPAIALGAQAFILLNIFIVSRGVQKGIERA
SKVMMPLLFIFFVFIHGRLSLPNAMEGVLYFLKPDFSLTSTGLYALGQSFALSGLVTVMLTYASYLDKKTNLVQSG
ISIVAMNISISIMAGLAIFQARSPFNIQSEGGPSLLFIVLPQLFDKMPFGTIFYVLFLLFLFATVTFVSVMLEINVDNITNQD
NSKRAKWSVILGTLTFVFGIPALSALYGMVADHFIFGKTFDAMDFLVSNLLMPFGALYLSLFTGYIFKKALAMEELHLD
ERAWKQGLFQVWFLFLRRFVFSFQSSSLWSSLPNLCNKGLEZ

MLKKWQLKDVLFLSIFGGVFVSGSYVYNILSLLTPLGLQAFANEILFGLWCMAAIPAAIFVPRVGSATIGEVLAA
LAEVLYGSQFGLGALLSGFVQQLGSEFGFIVTKNRYESWLSLTANSIGITLVSFVYEYIKLGYAFSLPFVLSLLVVRFSV
YFECTILVRAIVKLYHOFATGGKAZ

MVKVATQTPHISLFLILSLETSFIPSIALTLSVVAFCILFMLYYRRFKMLAWMIILAILPSFANYWAVQLHGDASQAVML
GTRAFVTVICIGLVFVSSVSLKELLYLAQKGLSRWSYALIVVFNSPFIQEQIKSLKEACLLRGQELHFWSPLIYSKVLML
TVFRWRHLYLRALSAHGDEHAQLKNSYRTFYIPKKTCLIYLLFFLLQTSFLZ

MRKHQLQVHKLTILSMMIALDVVLTPIFRIEGMAPMSSVNVNLAGIMMGVPYALAMATVTA
FIRMTTQGIPLALTGAT
FGALLAGLFYKYGRKFHYSALGEILGTGIIGSIVSYPMVLFSGSAKLSWFIYTPRFFGATLIGTAISFIAFRFLIKQEFFK
KVOGYFFSERIDZ

MQEFTNPFFIGSSSLIHITNEISCEMLANGILALGCKPVMADDSREVLDFTKQSQALFINLGHLSAEKEKAIRMAASYAN
QSSLPVVVDVAVGVTSSIRKSLVKDLLDYRPTVLKGNMSEIRSLVGLKHHGVGVGDASAKDQETEDLLQVLKDWQCQTP
GMSFLVTGPKDLVLSKNQVAVLNGCTELDWITGTGDLVALTAVFLSQGKTGFEAASCLAVSYLNIAAEKIVVQGMG
LEEFYQVNLNLSLLRRDENWDLTIKGEVVEZ

MNHKIAILSDVHGNATALEAVIADAKNQGASEYWLLGDFLPGPGANDLVALLKDLPTASVRGNWDDRVLEALDGQ
YGLEDPQEVOLLRMTOYLMERMDPATIVWLRSLPLLEKKEIDGLRFSISHNLPDKNYGGDLLVENDTEKFDQLLDAET

DVAVYGHVHKQLLRYGSQGGQIINPGSIGMPYFNWEALKNHRSQYAVIEVEDGELLNIQFRKVAYDYEALELAKSKG
LPFIEMEELRRDDNYQGHNLELLASLIEKHGYVEDVKNFFDFLZ

5 MNVNQIVRIPTLKANNRKLNETFYIETLGMKALLEESAFLSLGDQTGLEKLVLEEAPSMRTRKVEGRKKLARLIVKVE
NPLEIEGILSKTDSIHRLYKGQNGYAFEIFSPEDDLILHAEDDIASLVEVGEKPEFQTDLASISLSKFEISMELHLPDIESF
LESSEIGASLDFIPAQQGDLTVDNVTVDLSMLKFLVNELDIASLRQKFESTYFIPKSEKFFLGKDRNNVELWFEEVZ

10 MKWTKIIKKIEEQIEAGIYPGASFAYFKDNQWTEFYLGQSDPEHGLQTEAGLVYDLASVSKVVGVTCTFLWEIGQLD
IDRLVIDFLPESDYPDITIRQLLTHATDLDPFIPNRDLLTAPELKEAMFHLNRRSQPAFLYSDVHFLLLGFILERIFNQDL
VILKDQVWKPWGMTETKFGPVELAVPTVRGVEAGIVHDPKARLLGRHAGSAGLFSTIKDLQIFLEHYLADDFARDLNQ
NFSPLDDKERSLAWNLEGDWLDHTGYTGTFIMWNRQKQEATIFLSNRTEYKDERAQWILDRNQVMNLIRKEEZ

15 MMKKTYNHILVWGVIFYISICVFCFTPQEQSTVGVTGPIQHLGRLVFLLPFNSLWKLGEVSDIGQLCWIFLQNILNV
FLFFPLIFQLLYLFPNLRKTKKVLFSFLVSLGIECTQLILDFFFDNFRVFEIDDLWTNTLGGYLAWLLYKRLHKNKVRN
Z

20 MKIPLLTFAHKKFVYVLLTLLFLALVYRDVLMTYFFFDIHAPDLAKFDGQAIKNDLLKSALDFRILQFNLGFYQSFIPIII
VLLGFQYIELKNKVLRLSIGREVSQGLKRKLTQVASIPCLILVTVLIIAITYFFGTFSPLGWNSLFSDBGSLQRLLDGE
IKSYLFFTCVLLIGIFINAIYFLQIVDYVGNVTRSAITYLMFLWLGSMMLYSALPYMVPMTSLMQASYGDVSLMKLFTP
YILYIVPYMVLEKYEDNVZ

25 MFKVLQKVGKAFMLPIAILPAAGLLLIGGALSNTTIATYPILDNSIFQSIFQVMSSAGEVVFSNLSLLCVGLCIGLAKR
DKGTAALAGVTGYLVMTATIKALVKLFMAEGSAIDTG VIGALVVGIVAVYLHNRYNNIQLPSALGFFGGSRFVPIVTSF
SSILIGVFFVFWPPFQQLLVSTGGYISQAGPIGTFLYGFLMRLSGAVGLHHIYPMFWYTELGGVETVAGQTVVGAQKIF
30 FAQLADLAHSGLFTGTRFFAGRFSTMMFGLPAACLAMYSVPKNRRKKYAGLFFGVALTSFITGITEPIEFMFLFVSPV
LYVVHAFLDGVSFFIADVLNISIGNTFSGGVIDFTLFGILQGNAKTNWVLQIPFGLIWSVLYIIFRWFITQFNVLTPGRGE
EVDKSKEISEADSTNTADYKQDSLQIIRALGGSNNIEDVDACVTRLRVAVKEVNQVDKALLKQIGAVDVLEVKGQIQ
AIYGAKAILYKNSINEILGVDDZ

35 MKFRKLACTVLGAAGVLAACGNSGGSKDAKSGGDGAKTEITWWAFPVFTQECTGDGVGTYEKSIIEAFEKANPDI
KVKLETIDFKSGPEKITTAEAGTAPDVLFDAPGRHIIYQKNGKLAELNDLFTDEFVKDVNNENIVQASKAGDKAYMPI
SSAPFYMAMNKKMLEDAGVANLVKEGWTTDDFEKVLKALKDKGYTPGSLFSSGGQGGDQGFRAFISNLYSGSVTDEKV
SKYTTDDPKFVKGLEKATSWIKDNLINNGSQFDGGADIQNFANGQTSYTLWAPAQNGIQAKLLEASKVEVVEVPFSPD
40 EGKPALEYLVNGFAVFNKDDKKVAASKKFIQFIADDEKWEKDPVVRTGAFPVRTSFGKLYEDKRMETISGWTQYYSP
YYNTIDGFAEMRTLWFPMLQSVSNGDEKPADALKAFTKANETIKKAMKQZ

45 MQSTEKKPLTAFTVISTIILLTTLVLFIFPFYWILTGAFKSSQPDITIVIPPQWFPKMPTMENFQQLMVQNPAQWWMVNSVFI
SLVTMFLVCATSSLAGYVLAKKRFYQGRJLFAIFIAAMALPKQVVLVPLVRIVNFMGIHDTLWAVILPLIGWPFVFLM
KQFSENIPTELLESADIDGCGEIRTFWSVAFPIVKPGFAALAIFTFINTWNDYFMQLVMLTSRNNLTISLGVATMQAEMA
TNYGLIMAGAALAAPVIVTVFLVFQKSFTQGITMGAVKGZ

50 MKIMFKNFNINILLNRKIVLLLRIVLMILINHLSTAVQKQDAVIFFKRELISIFSNDYSEANLEIPKLLNLNLSFMVGW
LSVILLESDLADHYHHLIRYQSSSFFDYTRKRLVVISKFFTQDLFVWFLGGLPLGIHFKTVALLFLLAQLMMLYLLLSYLI
ALISAGAGFSFFLYFLAFVGQEWMMDHIVTVYLVLLSLLVMLIVSRLEEKFKKGZ

55 MGKGEMGKGVIGLEFDSEVLVNKAPTLQLANGKTATFLTQYDSKTLFAVDKEDIGQEIIGIAKGSIESMHNLPVNLG
ARVPGGVNGSKAAVHEVPEFTGGVNGTEPAVHEIAEYKGSDSLVTLTTKKDYTYKAPLAQALPETGNKESDLLASLG
LTAFFLGLFTLGKKREQZ

60 MKKTFLLVLGLFCLLPLSVFAIDFKINSYQGDLYIHADNTAEFRQKIVYQFEEDFKGQIVGLGRAGKMPSGFDIDPHPKI
QAAKNGAELADVTSEVTEADGYTVRVYNPGQEGDIVEVDLVWNLKNLLFLYDDIAELNWQPLTDSSESIEKFEFHVR
GDKGAELFFHTGKLFREGTIEKSNLDYTRLDNLPAKRGVELHAYWPRTFASARDQGLKGNRLEEFNKIEDSIVREK
DQSKQLVTWVLPISLISLLSVCFYFYRRKTPSVKYAKNHRLEYEPPMELEPMVLSEAVYSTLEEVSPLVKGAGKFTF
65 DQLIQATLLDVIDRGNVSIIEGDAVGLRLVKEDGLSSFEDCLNLAFSGKKEETLSNLFADYKVSDSLRYRAKVVSDEKR
IQARGLQLKSSFEVLNQMQEVRKRVSWGLPDYYRPLTGGEKALQVGMGALTILPLFIGFGLFLYSLDVHGYLYLPL

PILGFLGLVLSVFYYWKLRLDNRDGVLEAGAEVYYLWTSFENMLREIARLDQAELESIVVNRLLVYATLFGYADK
VSHLMKVHQIQVENPDINLYVAYGWHSTFYHSTAQMSHYASVANTASTYSVSSGSGSSGGGFSGGGGGSGAFZ

- 5 MKKVRKIFQKAVAGLCCISQLTAFSSIVALAETPETSIPAIGKVVIKETGEGGALLGDVAVFELKNNTDGTTVSQRTEAQTG
EAIFSNIKPGTYTLTEAQPPVGYKPKSTKQWTVVEVEKNGRTTVQGEQVENREEALSDQYPQTGTYPDVQTPYQIIKVDGS
EKNQGHKALNPNPYERVEGTLSKRIYQVNNLDDNQYGIELTVSGKTVYEQKDKSVPLDVVILLDNSNSMSNIRNKNA
RRAERAGEATRSIDKITSSENVALVITYASTIFDGTEFTVEKGVADKNGKRLNDSLFWNYDQTSFTTNTKDYSYLLK
10 TNDKNDIVELKNKVPTAEEDHDGNRLMYQFGATFTQKALMKADEILTQARQNSQKVIFHITDGVPTMSYPINFNAT
FAPSYQNQLNAFFSKSPNKDGILLSDFITQATSGEHTIVRGDQSYQMFTDKTVYEKGAPAAFPVKPEKYSEMKAAGYA
VIGDPINGGYIWLNNWRESILAYPFNSNTAKITNHGDPTRWYYNGNIAPDGYDVFTVGIGINGDPTGDEATATSMQSISS
KPENYTNVTDTTKILEQLNRYFHTIVTEKKSIENTITDPMGELIDLQLGTDGRFDPADYTLTANDGSRLENGQAVGGP
QNDGGLLKNAKVLVDTEKRIRVTGLYLGTDEKVTLYNVRLNDEFVSNKFYDTNNGRTTLHPKEVEQNTVRDFPIPKI
15 RDVRKYPEITISKEKKLGDIEFIKVNKNDKKPLRGAVFSLQKQHPDYPDIYGAIQNGTYQNVRTGEDGKLTFFKNLSDG
KYRLFENSEPAGYKPVQNKPIVAFQIVNGEVRDVTISVPQDIPAGYEFTNDKHYITNEPIPPKREYPRTGIGMLPFYILIG
CMMMGGVLLYTRKHPZ
- 20 MKSINKFLTMLAALLLTASSLFSAAVFFAAGTTTTSTVTHKLLATDGDMDKIANELETGNYAGNKVGVLPANAKEIAG
VMFVWNTNTNNEIIDENGQTLGVNIDPQTFKLSGAMPATAMKKLTEAEGAKFNTANLPAAKYKIYEIHSLSYVGEDGA
TLTGSKAVPIEIELPLNDVDDAHVYPKNTAKPKIDKDFKGANPDTPRVKDTVPVNHQVGDVVEYEIVTKIPALANYA
TANWSDRMTEGLAFNKGTVKVTVDVDALEAGDYALTEVATGFDLKLTDAGLAKVNDQNAEKTVKITYSATLNDKAI
VEVPESNDVTFNYGNPDHGNTPKPNKPNENGDLTLTKTWVDATGAPIPAGAEATFDLVNAQTGKVVQTVTLTDDKN
25 TVTVNGLDKNTEYKFVERSIKGYADYQEIITAGEIAVKNWKDENPKPLDPTPEKVVYTGKKFVKVNDKDNRLAGAEF
VIANADNAGQYLARKADKVSQEEKQLVVTTKDALDRAVAAYNALTAQQQTQKEKEKVDKAAAYNAAVIAANNAF
EWVADKDNENVVKLVSDAQGRFEITGLLAGTYYLEETKQPAGYALLTSRQKFEVTATSYSATGQIEYTAGSGKDDAT
KVVNKKITIPQTGGIGITIFAVAGAAMGIAVYAYVKNKDEDDQLAZ
- 30 MTMQKMQMISMIRIFFVMALCFSLVWGAHAVQAQEDHTLVQLQLENYQEVVSQLPSRDGHRQLQVWKLDDSSYSYDDR
QVRDLHSWDENKLSFFKTSFEMTFLENQIEVSHIPNGLYYVRSIIQTDVSYPAEFLFEMTDQTVPEPLVIVAKKTDTM
TTKVKLIKVDQDHNRLLEGVGFKLVSVARDVSEKEVPLIGEYRYSSSGQVGRITLYTDKNGEIFVTNLPLGNRYRKEVEPL
AGYAVTTLTDVQLVDHQLVTITVVNQKLPNGVDFMKVDGRTNTSLQGAMFKVMKEESGHYTPVLQNGKEVVVTS
35 GKDGFRFRVEGLEGTYYLWELQAPTGYVQLTSPVSFTIGKDRKELVTVVKNKRPRIDVPDTGEETLVYLDACCHFV
VWZ
- 40 MSHIYLSIFTSLLMLGLVNVAQADEYLRIEMEAAYAPFNWTDQDDSDNGAVKIDGTNQYANGYDVQIAKKIADLGE
PLVVTKWEGLVPALTSKGIDMIIAGMSPTAERKQEIASSSYTSEPVLLVKKDSAYASAKSLDDFNAGAKITSQQGVYL
YNLIAQIPGAKKETAMGDFQMRQALEAGVIDAYVSRPEALTAEAAANSKFMIQVEPGFKTGEEDTAIAIGLRKNDNR
ISQINASIETISKDDQVALMDRMIKEQPAEATTTETSSSFFSQVAKILSENWQQLRGAGITLLISVGTIIGLIIGLAIGVFR
TAPLSENKVIYGLQKLGVWVLNVYIEIFRGTPMIVQSMVIYGTGAQAFGINLDRTLAAIFVSINTGAYMTEIVRGILAV
45 DKGQFEAATALGMTHNQTMRKIVLPQVVRNLPATGNEFVINIKDTSVLNVISVVELYFSGNTVATQTYQYFQTFILAV
IYFVLTFVTIRLRFIERRMDMDTYTTGANQMOTEDLKZ
- 50 MTQAILEIKHLKKSYGQNEVLKDISLTVHKGEVISIIGSSSGSKSTFLRSINLLETPTDGQILYHGQNVLEKGYDLTQYREK
LGMVVFQSFNLFENLVLENTIVAQTTVLKRRETEAEKIAKENLEKVGMMGERYWQAKPKQLSGGQKQVIAIARALSMN
PDAILFDEPTSAIDPEMVGEVLKIMQDLAQEGLTMIVVTHEMEFARDVSHRVIFMDKGVIAEEGKPEDLFTNPKEDRK
EFLQRYLKZ
- 55 MKKYQLLFKISAVFSYLFVFSLSQLTLIVQNYWQFSSQIGNLFWIQNILSLLFIGVMIVVLVKTGHGYLFRIPRKKWLW
YSILTVLVLVFIQSFNVQTAHVQSTAEGWAVLIGYSGTNFAELGIYIALFFLVPLMEELIYRGLLQHAFFKHRSRFGDLL
LPSILFALPHFSSLPDLLDIFVFATVGIIFAGLTRYTKSIYPSYAVHVINNIVATFPFLLTFLHRVLGZ
- 60 MNKKQWLGLGLVAVAAVGLAACGNRSSRNAASSSDVKTAAIVTDTGGVDDKSFNQSAWEGLQAWGKEHNLSKDN
GFTYFQSTSEADYANNLQQAAGSYNLIFGVGFALNNVKAKEHTDLNYVLIDDVIKQKNVASVTFADNESGYLA
GVAAAKTTKTKQVGFVGGIESEVISRFEAGFKAGVASVDPSIKVQVDYAGSFGDAKAGKTIAAAQYAAGADIVYQVAG
GTGAGVFAEAKSLNESRPENEKVVVIGVDRDQEAEGKYTSKDGKESNFVLVSTLKQVGTTVKDISNKAERGEFFGGQV
IVYSLKDKGVDLAVTNLSEEGKKAVEDAKAKILDGSKVPEKZ

MSKKLQQISVPLISVFLGILLGAIVMWIFGYDAIWGYEELFYTAGFSLRGIGEIFRAMGPLVLIGLGFASRAGFFNVGL
PGQALAGWILSGWFALSHDMPRPLMILATIVIALIAGGIVGAIPGILRAYLGTSEVIVTIMMNYIVLYVGNAFIHAFPKD
FMQSTDSTIRVGANATYQTPWLAELTGN SRMNIGIFFAIIA VAVIWFMLKKTTLGFEIRAVGLNPHASEYAGISAKRTIIL
SMIISGALAGLGGA VEGLGTFQNVYVQGSSLAIGFNGMAVSLAANSPIGILFAAFLFGVLQVGAPGMNAAQVPSELVSI
VTASIIFFVSVHYLIERFVKPKKQVKGGKZ

MGVKKKLKLTSLGLSLLIMTACATNGVTS DITAESADFW SKLVYFFAEIIRFLSFDISIGVGILFTVLIRTVLLPVFQVQ
MVASRKMQEAPRIKALREQYPGRDMESRTKLEQEMRKVFKEMGVRQSDSLWPILIQMPVILALFQALS RVDFLKTGH
FLWINLGSVDTTLVLPILAAVFTFLSTWLSNKALSERNGATTAMMYGIPVLIFAVYAPGGVALYWTVSNA YQVLQTY
FLNNPFKIIAEREAVVQAQKDLENRKRKAKKKAQKTZ

MVIDPFAINELDYLVSHFSDHIDPYTAAAILNNPKLEHV KFIGPYHCGRIWEGWGVPKERIIVVKPGDTIELKDMKIH
AVESFDRCLVTLVPVNGADETGGELAGLAVTDEEMAQKAVNYIFETPGGTIYHGADSHFSNYFAKHGKDFKIDVALNN
YGENPVGIQDKMTSIDLLRMAENLRTKVIPVHYDIWSNFMAS TNEILELWKM RKDRLQYDFHPFIWEVGKGYTPQD
QHLVEYHHPRGFD DCFEQDSNIQFKALLZ

MFLSGWLSSFANTYIHDLLGVLPD SPFLNAFESAIAAPLVEEPLKLLSLVFLALIPVRKLSLFLGLIASGLGFQMIKDI
GYIRTDLPEGFDFTISRILERIISGIASHWTFSGLA VVG VYLLYRAYKGQKVGKKQGLIFLGLALGTHFLFNSPFVELETEL
PLAIPVVTALALYGFYHAYCFVEKHNE LMTZ

MKVEPRCDVLSRMSHFFIRILIMELQELVERS WAIRQAYHELEVKH HDSKWTVEEDLLALSNDIGNFQRLVMTKQGRY
YDETPYTLEQKLS ENIWWLLELSQRLDIDILTEMENFLSDKEKQLNVRTWKZ

MLDWKQFFLAYLRSRSLFIYLLSLAFLVLLFQFLASLGIYFLYFFFLCCFVLTILFFTWDILVETQVYRQELLYGEREAK
SPLEIALAEKLEAREMELYQQRSKAERKLTDLDDYTLVWHQIKTPIAASQLLVAEVVDRQLKQQLQEIEFKIDS YTNLV
LQYLRLESFHDDLVLKQVQIEDLVKEIIRKYALFFIQKGLNVNLHDLDKEIVTDKKWLLVVIEQIISNSLKYTKEGGLEIY
MDDQELCIKDTGIGIKNSDVLRFVFERGFSGYNGRLTQSSSGLGLYLSKKISEELGHQIRIESEVGKGTTVRIQFAQVNLVL
EZ

MELNTHNAEILL SAANKSHYPQDELPEIALAGRSNVGKSS FINTMLNRKNLARTSGKPGKTQLL NFFNIDDKMRFDVDP
GYGYARVSKKEREKWGCMIEEYLTRENLRVAVSLVDLRHDP SADDVQMYEFLKYYEIPVIVATKADKIPRGKWNKH
ESAIKKKLNFDPSDDFILFSSVSKAGMDEAWDAILEKLZ

MTKKQLHLVIVTGMSGAGKTVAIQSFEDLGYFTIDNMPPALLPKFLQLVEIKEDNPKLALVVD MRSRSFFSEIQAVLDEL
ENQDGLDFKILFLDAADKELVARYKETRRSHPLAADGRILDGIKLERELLAPLKNMSQNVVDTTTELTPRELKRLAEQF
SDQEQAQSFRIEVM SFGFKYGIPIADLVFDVRFPLPNPYLP ERLNQTGVDEPVYDYVMNHPESDFYQHLLALIEPILP
SYQKEGKSVLTIAMGCTGGQHRSAFAKRLAQDLSKNWSVNEGHRDKDRRKETVNR SZ

MRKPKITVIGGGTGSPVILKSLREKDVEIAAIVTVADDGSSGELRKNMQQLTPPGDLRNVLVAMS DMPKFYEKVFQYR
FSEDAGAFAGHPLGNLIIAGLSEMQGSTYNAMQLLSKFFHTTGKIYPS SDHPLTLHAVFQDGTVEVAGESHIVDHRGIIDN
VYVTNALNDDTPLASRRVVQTILESDMIVLPGSLSFTSILPNIVIKEIGRALLETKAEIAYVCNIMTQRGETEHFTDSDHV
EVLHRHLGRPFIDTVLVNIEKVPQEYMNSNRFDEYLVQVEHDFVGLCKQVSRVISSNFLRLENGGAFHDGDLIVDELMR
I
IQVKKZ

MKNLIKLLIIRLIVNLADSVFYIVALWHVSNNYSSSMFLGIFIAVNYPD LLLIFFGPVIDRVNPQKILIISILVQLAVAVIFL
LLLNQISFWVIMSLVFISVMASISYVIEDVLIPQVVEYDKIVFANSLSISYKVLDSIFNSFASFLQVAVVG FILLVKIDIGIFL
LALFILLLLKFRTSNANIENFSFKYKREVLQGTKFILNNKLLFKTSISLT LINFFYSFQTVVVPIFSIRYFDGPIFYGIFLTIA
GLGGILGNMLAPIVIKYLKSNQIVGVFLFLNGSSWLVAIVIKDYTL SLILFFVCFMSKGVFNIIFNSLYQQIPPHQLLGRVN
TTIDSISFGMPIGSLVAGTLIDLNIELVLIAISIPYFLFSYIFYTDNGLKEFSIYZ

MMSNKNKEILIFAILYTVLFMFDGVKLLASLMPSAIAANYLVYVVLALYGSFLFKDRLIQQWKEIRKTKRKKFFFGVLTGW
LFLILMTVVFEFVSEMLKQFVGLDGOGLNQSNQSTFQEQPLLIAVFACVIGPLVEELFFRQVLLHYLQERLSGLLSIILV
GLVFALTHMHSLSALSEWIGAVGYLGGGLAFSHIYVKEKENIYYP LLVHMLSNSLSLILAISIVKZ

5 LKKPIIEFKNVSKVFEDSNTKVLKDINFELBEGKFYTLGASGSGKSTILNIIAGLLDATTGDIMLDGVRINDIPTNKRDVH
TVFQSYALFPHMNVFENVAFPLRLRKIDKKEIEQVRAEVLKMOVLEGYEKRSIRKLSGGQRQRVAIARAIINQPRVVLLD
EPLSALDLKLRTDMQYELRELQQLGITFVFTVDQEEALAMSDWIFVMNDGEIVQSGTPVDIYDEPINHFVATFIGESN
ILPGTMIEDYLVEFNGKRFEAVDGGMKPNPEVEVVIRPEDLRITLPEEGKLQVKVDTQLFRGVHYEIIAYDELGNEWMI
HSTRKAIVGEEIGLDFEPEDIHIMRLNETEEEFDARIEEYVEIEEQEAGLINAIEEERDEENKLZ

10 MKSMRILFLLALIQISLSSCFLWKECILSFKQSTAFFIGSMVFVSGICAGVNYLYTRKQEVHSLASKSVKLFYSMLLLIN
LLGAVLVLSNLFNIKNTLQQLVDFLLPSFFFLGDLDFLPLKKYVRDFLAMLDRKKTVLVTLATLLFLRNPMTIVSL
LIYIGLGLFFAAYLVPNSVKKEVSFYGHIFRDLVLVIVTLIFFZ

15 MVKKIIGMVLALLSVTVVGVGVFAYTIYQQGTETLAKTYKKIGEETKVIEATEPLTILLMGVDTGNVERTETWVGRSDS
MILMTVNPCKTKTTMMSLERDILTRESGNGQAHEAKLSAYADGGAELAIETIQKMMNIHIDRYVMVNMRLGQLKLV
DAVGITVNNILGFPISISDQEEFNISIGVGEQHIGGEEALVYARMRYQDPEGDYGRQKRQREVIQKVMKALSLSNIGH
YQEILKALSDNMQTNIDLSAKSIPNLLGYKDSFKTETQQLQGEIEILQGVSYQIVSRAHMLEMQNLLRRSLGQEEVTQL
ETNAVLFEEDLFGRAVPGDEDNZ

20 MKKQAYVIALTSFLFVFFFSHSLLEILDFDWSIFLHDVEKTEKFVFLLLVFSMSMTCLLALFWRGIEELSLRKMQANLK
RLLAGQEVVQVADPDLASFKSLSGKLNLLTEALQKAENQSLAQEEEEIEKERKRIARDLHDTVSQELFAAHMILSGISQ
QALKLDREKMQTQLQSVTAILETAQKDLRVLLHLRPVELEQKSLEIGIQILLKELEDKSDLRVSLKQNMTKLPKKIEEH
FRILQELISNTRLRHAQASCLDVLYQTDVELQLKVVDNIGIFQLGSLDDLSYGLRNIKERVEDMAGTVQLLTAPKQGLA
25 VDIRIPLDKEZ

30 MIVSIISQGFVWAILGLGIFMTFRILNFPDMTTEGSFPLGGAVAVTLITKGVNPFPLATLVAVGAGCLAGMAAGLLYTKGK
IPTLLSGILVMTSCHSIMLLMGRANLGLLGTQKIQDVLFPDSDLNQLLTGLIFVSIVIALMLFFLDTKLQAYIATGDNP
DMARSFGIHTGRMELMGLVLSNGVIALAGALIAQQEGYADVSRGIGVIVVGLASLIIGEIVFKSLSLAERLVTIVVGSIA
QFLVWAVIALGFNTSYLRLYSALILAVCLMIPTFKQTLKGAKLSKZ

35 MKKMKVWSTVLATGVALTTLAACSNGSSTTASSSEKADKSQELVIYSNSVSNRGRDWLTAKAKEAGFNKIMVDIAG
AQLADRIVIAEKNNAVADMVFGIGAVDSNKIRDQKLLVQYKPKWLDKIDQSLSDKDNYYNPVIVQPLVLIGAPDVKEMP
KDWTELGSKYKGKYSISGLQGGTGRAILASILVRYLDDKGELGVSEKGWEVAKYLNAYTLQKGESSIVKMLDKEDPI
QYGMWVGSGALVGQKEQNVVFKVMTPEIGVPFVTEQTMVLSTSKKQALAKEFIDWFGQSEIQVEYSKNFGSIPANKD
40 ALKDLPEDTKKFVDQVKPQNIDWEAVGKHLDEWVEKAELEYVQZ

45 MIKFDNIQIKYGDFVAIDNLNLDIHEGEFFTLGPGSGCGKSTTLRALVGFLDPSSGSIEVNGTDVTHLEPEKRGIGIVFQSY
ALFPTMTVFDNIAFGLKVKKVAPDVIAKVSAAKIKISDQQLQRNVSELGGQQQRVALARALVLEPKILCLDEPLS
NLDKLRVDLRKELKRLQKELGITTLYVTHDQEEALTLSDRIAVFNNGYIEQVGTPEIYHNSQTEFVCDFIGDINVLT
ETVHEVLLKNTSVFLEDKKGIRLEKVRFNRETEQDFILKGTIIDVEFSGVTHIYTIKVSQILNVTIDSQAIRSVGESV
ELFITPSDVLQFZ

50 MRHKLNLKDWLIRLGLIWFLVTFIYPNFDLVVNVFVKGGEFSLDAVHRVLKSQRALQSIMNSFKLAFSLIITVNVVGIL
CVLFTFYFDIKGAKILKLGMYMTSLIYGGVVLATGYKFVYGPYGLITKFLQNVIPSLDPNWFYGGAVLFIMTFSGTANHT
LFLTNTIRSVDYHTIEAARNMGAKPFTVFRKVVLPTLIPTLFALTIMVFLSGLSAAVAPMIVGGKEFQTINPMITFAGMG
NSRDLAALLAILGIATTILLTIMNKIEKGGNYISIKTKAPLKKQKASKPWNIHIVAYGLFTVFMPLPLIFIVLSFTDPV
AIQTGNLTLNFTLENYRLFFSNSAAFSPFLVSFIYSIIAATTATILAVVFARVVRKHKSFRDFLFEYGALLPWLLPSTLLA
VSLFTFNQPFQFLVLNQILVGSVLILLIAYIVVKIPFSYRMVRAILFSVDDMEDAARSMGASPFYTMKVIIPFILPVVLS
VIALNFNSLLTDFDLSVFLYHPLAQPLGITIRSAGDETATSNALVFVYITIVLMIISGTVLYFTQRPGRKVRKZ

Table 3

ID201 - 4106.4

5 ATGATAAAAAATCCTAAATTATTAACCAAGTCTTTTTTAAGAAGTTTTGCAATTCTAGGTGGTGTGGTCTAGTCAT
 TCATATAGCTATTTATTTGACCTTTCCTTTTTATTATATTTCAACTGGAGGGGAAAAGTTTAAATGAGAGCGCAAGAG
 TGTTCACGGAGTATTAAAGACTAAGACATCTGATGAAATTCGAAGCTTACTCCAGTCTTATTCAAAGTCCTTGACC
 ATATCTGCTCACCTTAAAGAGATATTGTAGATAAGCGGCTCCCTCTTGTGCATGACTTGGATATTAAAGATGGAAA
 10 GCTATCAAATTATATCGTGATGTTAGATATGTCTGTTAGTACAGCAGATGGTAAACAGGTAACCGTGCAATTTGTTT
 ACGGGGTGGATGTCTACAAAGAAGCAAAGAATATTTTGTCTTTGTATCTCCCATATACATTTTTGGTTACAATTGCT
 TTTTCCTTTGTTTTTCTTATTTTTTATACTAAACGCTTGCTCAATCCTCTTTTTTACATTTTCAAGAAGTACTAGTAA
 AATGCAAGATTGGATGACAATATTCGTTTTGATGAAAGTAGGAAAGATGAAGTTGGTGAAGTTGGAAAACAGATTA
 ATGGTATGTATGAGCACTTGTGGAAGTTATTTATGAGTTGGAAAGTCGTAATGAGCAAATTTGAAAATGCAAAAT
 CAAAAGGTTTTCTTTGTCCGCGGAGCATCACATGAGTTGAAAACCCCTTTAGCCAGTCTTAGAATTATCCTAGAGAA
 15 TATGCAGCATAATATTGGAGATTACAAAGATCATCCAAAATATATTGCAAAGAGTATAAATAAGATTGACCAGATGA
 GCCACTTATTAGAAGAAGTACTGGAGTCTTCTAAATTCGAAGAGTGGACAGAGTGTCTGTGAGACCTTGACTGTTAAG
 CCAGTTTTAGTAGATATTTATCACGTTATCAAGAATTAGCTCATTCAATAGGTGTTACAATTGAAAATCAATTGAC
 AGATGCTACCAGGTCGTGATGAGTCTTAGGGCATTGGATAAGGTTTTGACAAACCTGATTAGTAATGCAATTAAAT
 ATTCAGATAAAAAATGGGCGTGAATCATATCCGAGCAAGATGGCTATCTCTATCAAAAATACATGTGCGCCTCTA
 20 AGTGACCAAGAAC TAGAACATTTATTTGATATATTCTATCATTCTCAAATCGTGACAGATAAGGATGAAAGTTCCGG
 TTTGGGTCTTTACATTTGTGAATAATATTTAGAAAGCTATCAAATGGATTATAGTTTTCTCCCTTATGAACACGGTA
 TGGAATTTAAGATTAGCTTGTAG

25 MIKNPKLLTKSFLRSFAILGGVGLVHIAIYLTFFFYIQLGEKEKFNESARVFTYELKTKTSDEIPSLQSYSKSLT
 ISAHLKRDIVDKRLPLVHLDLDIKDGKLSNYIVMLDMSVSTADGKQVTVQFVHGVVDVYKEAKNILLLYPYTFLVTIA
 FSVFVSFYFTKRLNPLFYI SEVTSKMQLDDNIRFDES RKDEVGEVKGQINGMYEHL LKVIYELES RNEQIVKLQN
 QKVSFVRGASHELKTPLASLR IILENMQH NIGDYK DHPKYIAKSINKIDQMSH LLEEVL ESKFQEWTECRETLTVK
 PVLVDILSRYQELAHSIGVTIENQLDTRVVM SLRALDKVLNLISNAIKYSDKNRVI ISEQDGYLSIKNTCAPL
 30 SDQLEHLFDIFYHSQIVTDKDESSGLGLYIVNNILESYQMDYSFLPYEHGMEFKISLZ

ID202 - 4106.9

35 ATGGATAAAATTATTAAAACTATATCAGAAAGCGGAGCCTTTTCGTGCTTTTGTCTTGATAGCACTGAAACCGTCCG
 CACTGCTCAAGAAAAACATCAAACCAAGCTAGCTCAACTGTAGCGCTTGGTCAACTCTTATCGCTAGCCAGATTC
 TCGCAGCCAATGAAAAAGGAAATACCAAACCTTACAGTTAAGGTGTTGGGATCTAGCTCTCTAGGTGCTATTATCACC
 GTCGCTGATACCAAGGGGAACGTCAAAGGCTATGTTCAAATCCTGGTGTGACATCAAAAAGACTGCCACTGGTGA
 AGTCCTAGTCGGACCTTTTGTGGAAATGGTCAATTCCTCGTTATCACAGACTACGGTACTGGAATCCTTACAAC
 40 CTATAACTCCCCTCATCTCTGGAGAAATCGGTGAAGACCTTGCCCTTTACCTTACTGAAAGCCAACAACGCCTTCA
 GCGGTGCGCCTCAATGTCTTTTGGACGAGGAAGACAAGGTCAAGGTTGCAGGTGGTTTCTAGTTCAAGTCTTGCC
 AGGAGCCAAGAAAGAGAGATTGCTCGCTTTGAAAAACGCATCCAAGAAATGCCAGCTATCTCTACTCTCTCGAAA
 GCGACGACCATATCGAAGCCCTCCTCAAGGCTATCTACGGGGACGAAGCCTACAAGCGTCTTTCTGAAGAAGAAATC
 CGTTTCCAATGTGACTGTAGCCATGAACGCTTTATGAACGCTCTTGCCAGCCTTCCAAGCTCAGACTTACAGGAAAT
 45 GAAAGAGGAAGACCAGGGGCAGAAATCACTTGTCAATTCTGCCAACTACTTACAACCTTGTATGAAAAGGACCTGG
 AGGAACTCATTCTGTGACAAATCTTAA

50 MDKIIKTISESGAFRAFLVDSTETVRTAQEKHQQTASSTVALGRTLIASQILAANEKGNTKLTIVKLVGSSSLGAIIT
 VADTKGNVKG YVQNPVVDIKKTATGEVLVGPFGVNGQFLVITDYGTGNPNSITPLISGEIGEDLAFYLTESQQT
 AVGLNVLLDEEDKVKVAGGFLVQVLP GAKKEE IARFEKRIQEMPAISTLLESDDHIEALLKAIYGDEAYKRLSEEEI
 RFQCDCSHERFMNALASLPSSDLQEMKEEDHGAETCQFCQTTYNFDEKDLEELIRDKSZ

ID203 - 4115

55 ATGAAATCAATAACTAAAAAGATTAAAGCAACTCTTGCAAGGAGTAGCTGCCTTGTGTTGAGTATTTGCTCCATCATT
 TGTATCTGCTCAAGAAATCATCAACTTACACTGTTAAAGAAGGTGATACACTTTCAGAAATCGCTGAAACTCACAACA
 CAACAGTTGAAAAATGGCAGAAAACAACCACATTGATAACATTCAATTGATTATGTTGATCAAGAGTTGGTTATC
 GATGGCCCTGTAGCGCTGTTGCAACACCAGCGCCAGCTACTTATGCGGCACCAGCCGCTCAAGATGAAACTGTTTT

AGCTCCAGTAGCAGAACTCCAGTAGTAAGTGAAACAGTTGTTTCAACTGTAAGCGGATCTGAAGCAGAAGCCAAAG
AATGGATCGCTCAAAAAGAAATCAGGTGGTAGTATACAGCTACAAATGGACGTTATATCGGACGTTACCAATTAA

5 MKSITKKIKATLAGVAALFAVFAPSFVSAQESSTYTVKEGDTLSEIAETHNTTVEKLAENNHIDNIHLIYVDQELVI
DGPVAPVATPAPATYAAPAAQDETVSAPVAETPVVSETVVSTVSGSEAEKEWIAQKESGGSIQQLQMDVISDVTNZ

ID204 - 4117.1

10 ATGAATTTAGGAGAATTTTGGTACAATAAAATAAATAAGAACAGAGGAAGAAGGTTAATGAAGAAAGTAAGATTTAT
TTTTTTAGCTCTGCTATTTTCTTAGCTAGTCCAGAGGGTGCAATGGCTAGTGATGGTACTTGGCAAGGAAAAACAGT
ATCTGAAAGAAGATGGCAGTCAAGCAGCAAAATGAGTGGGTTTTTGATACTCATTATCAATCTTGGTTCTATATAAAA
15 GCAGATGCTAACTATGCTGAAAATGAATGGCTAAAGCAAGGTGACGACTATTTTACCTCAAATCTGGTGGCTATAT
GGCCAAATCAGAATGGGTAGAAGACAAGGGAGCCTTTTATTATCTTGACCAAGATGGAAGATGAAAAGAAATGCTT
GGGTAGGAACCTTCTATGTTGGTGCAACAGGTGCCAAAGTAATAGAAGACTGGGTCTATGATTCTCAATACGATGCT
20 TGGTTTTATATCAAAGCAGATGGACAGCACGCAGAGAAAGAATGGCTCCAAATTAAGGGAAGGACTATTATTTCAA
ATCCGGTGGTTATCTACTGACAAGTCAGTGGATTAATCAAGCTTATGTGAATGCTAGTGGTGCCAAAGTACAGCAAG
GTTGGCTTTTTGACAAACAATACCAATCTTGGTTTTTACATCAAAGAAAAATGAAAACCTATGCTGATAAAGAATGGATT
25 TTCGAGAATGGTCACTATTATTATCTAAAATCCGGTGGCTACATGGCAGCCAATGAATGGATTGGGGATAAGGAATC
TTGGTTTTATCTCAAATTTGATGGGAAAAATGGCTGAAAAGAATGGGTCTACGATTCTCATAGTCAAGCTTGGTACT
ACTTCAAATCCGGTGGTTACATGACAGCCAATGAATGGATTGGGGATAAGGAATCTTGGTTTTATCTCAAATCTGAT
GACAGCCAATGAATGGATTGGGGATAAGGAATCTTGGTTTTTACCTCAAATCTGATGGGAAAAATAGCTGAAAAAGAAT
30 GGGTCTACGATTCTCATAGTCAAGCTTGGTACTACTTCAAATCTGGTGGCTACATGGCGAAAAATGAGACAGTAGAT
GGTTATCAGCTTGGGAAGCGATGGTAAATGGCTTGGAGGAAAAACTACAAATGAAAATGCTGCTTACTATCAAGTAGT
GCCTGTTACAGCCAATGTTTATGATTGATGGTGAAGGCTTTTCTATATATCGCAAGGTAGTGTCTGATGGCTAG
ATAAGGATAGAAAAAGTATGACAAGCGCTTGGCTATTACTATTTCTGGTTTGTGAGGCTATATGAAAACAGAAGAT
35 TTACAAGCGCTAGATGCTAGTAAGGACTTTATCCCTTATTATGAGAGTATGGCCACCGTTTTTATCACTATGTGGC
TCAGAAATGCTAGTATCCAGTAGCTTCTCATCTTTCTGATATGGAAGTAGGCAAGAAATATATTCCGGCAGATGGCC
TGCAATTTTGTAGGTTTTAAGCTTGAGAATCCCTTCTTTTCAAAGATTTAACAGAGGCTACAAACTACAGTGTCTGAA
GAATGGATAAGGTATTAGTTTGGCTAAACATTAACTAGCCCTTTTGGAGAACAAGGGCGCTACTTTTAAAGGAAGC
CGAAGAACATTACCATAATGCTCTTTATCTCTTTGCCCATAGTGCCCTAGAAAGTAAGTGGGGAAGAAGTAAAA
40 TTGCCAAAGATAAGAATAATTTCTTTGGCATTACAGCCTATGATACGACCCCTTACCTTTCTGCTAAGACATTTGAT
GATGTGATAAGGGAAATTTAGGTGCAACCAAGTGGATTAAGGAAAATTATATCGATAGGGGAAGAACTTTCTTGG
45 AAACAAGGCTTCTGGTATGAATGTGGAATATGCTTCAGACCCCTATTGGGGCGAAAAAATTGCTAGTGTGATGATGA
AAATCAATGAGAAGCTAGGTGGCAAGATTAG

MNLGEFWYNKINKNRGRRLMKKVRFI FLALLFFLASPEGAMASDGTWQKQYLKEDGSQAANEWVFDTHYQSWFYIK
40 ADANYAENEWLKQDDYFYLKSGGYMAKSEWVEDKGAFYYLDQDGKMKRNAWVGTSYVGATGAKVIEDWYDSQYDA
WFYIKADGQHAKEWLQIKGKDYFYSKGGYLLTSQWINQAYVNASGAKVQQGWLFDKQYQSWFYIKENGNAYADKEWI
FENGHYIYLLKSGGYMAANEWIWDKESWFYLFKFDGKMAEKEWVYDSHSQAWYFYSKSGGYMTANEWIWDKESWFYLKSD
GKIAEKEWVYDSHSQAWYFYSKSGGYMTANEWIWDKESWFYLKSDGKIAEKEWVYDSHSQAWYFYSKSGGYMAKNETVD
GYQLGSDGKWLGGKTTNENAAYYQVVPVTANVYDSGEKLSYISQGSVVWLDKDRKSDDKRLAITISGLSGYMKTED
45 LQALDASKDFIPYYESDGHFRFYHYVAQNASIPVASHLSMDEVGKKYYSADGLHFDGFKLENPFLFKDLTEATNYSAE
ELDKVFSLLNINNSLLENKGATFKEAEHYHINALYLLAHSALÉSINWGRSKIAKDKNNFFGITAYDTPYLSAKTFD
DVDKGILGATKWIKENYIDRGRTFLGNKASGMNVEYASDPYWGEEKIASVMMKINEKLGKGDZ

ID205 - 4118.1

50 ATGAAAAAATTAGGTACATTACTCGTTCTCTTTCTTTCTGCAATCATTTCTGTAGCATGTGCTAGCGGAAAAAAGA
TACAACTTCTGGTCAAAAACATAAAGTTGTTGCTACAACTCAATCATCGCTGATATTACTAAAAATATTGCTGGTG
ACAAAATTGACCTTCATAGTATCGTTCCGATTGGGCAAGACCCACACGAATACGAACCACTTCTGAAAGACGTTAAG
55 AAAACTTCTGAGGCTAATTTGATTTTCTATAACGGTATCAACCTTGAACAGGTGGCAATGCTTGGTTTACAAAAT
GGTAGAAAAATGCCAAGAAAACTGAAAACAAGACTTTCGCAGTCAGCGACGGCGTTGATGTTATCTACCTTGAAG
GTCAAAATGAAAAAGAAAAAGAACCCACAGCTTGGCTTAACCTTGAACACGGTATTTTGTGATAAAGATATC
GCCAAACAATTGAGCGCCAAAGACCCCTAACAAATAAAGAATTCTATGAAAAAATCTCAAAGAATATACTGATAAGTT
AGACAACTTGATAAAGAAAGTAAGGATAAATTTAATAAGATCCCTGCTGAAAAGAAACTCATTGTAACAGCGAAG
GAGCATTCAAATACTTCTCTAAAGCCTATGGTGTCCCAAGTGCTTACATCTGGGAAATCAATACTGAAGAAGAAGGA
60 ACTCCTGAACAAATCAAGACCTTGGTTGAAAAAATTCGCAACAAAAAGTTCCATCACTCTTTGTAGAAATCAAGTGT
GGATGACCGTCCAATGAAAACCTGTTTCTCAAGACACAAACATCCCAATCTACGCTCAAATCTTTACTGACTCTATCG

CAGAACAAGGTAAAGAAGGCGACAGCTACTACAGCATGATGAAATACAACCTTGACAAGATTGCTGAAGGATTGGCA
AAATAA

5 MKKLGTLVLFLSAIILVACASGKKDTTSGQKLKVATNSIIADITKNIAGDKIDLHSIVPIGQDPHEYEPLPEDVK
KTSEANLIFYNGINLETGGNAWFTKLVENAKKTENKDYFAVSDGVDVIYLEGQNEKGKEDPHAWLNLENGIIFAKNI
AKQLSAKDPNNKEFYENLKEYTDKLDKLDKESDKFNKI PAEKKLIVTSEGAFKYFSKAYGVPSAYIWEINTEEEG
TPEQIKTLVEKLRTKVP SLFVSSVDDRPMTVSQDTNIP IYAQIFTDSIAEQGKEGDSYYSMMKYNLDKIAEGLA
KZ

10 ID206 - 4119.1

ATGGAATGGTATAAAAAATCGGACTTCTTGCAACTACAGGTTTAGCTTTGTTGGGCTCGGCGCTTGCTCCAACTA
TGGTAAATCTGCGGATGGCACAGTGACCATCGAGTATTTCAACCAGAAAAAGAAATGACCAAAACCTTGGAAGAAA
15 TCACCTCGTGATTTTGAAGAGAAAACCTTAAGATCAAGGTCAAAGTCGTCAATGTACCAAATGCTGGTGAAGTATTG
AAGACACGCGTTCTCGCAGGAGATGTGCCTGATGTGGTCAATATTTACCCACAGTCCATCGAACTGCAAGAATGGGC
AAAAGCAGGTGTTTTGAAGATTTGAGCAACAAAGACTACCTGAAACGCGTGAAAAATGGCTACGCTGAAAAATATG
CTGTAAACGAAAAAGTTTACAACGTTCCCTTTACAGATCAATGCTTATGGAATTTACTACAACAAAGATAAATTCGAA
GAAC TGGGCTTGAAGGTTCCCTGAAACCTGGGATGAATTTGAACAGTTAGTCAAAGATATCGTTGCTAAAGGACAAAC
20 ACCATTGGAATTGCAGGTGCAGATGCTTGACACTCAATGGTTACAATCAATTAGCCTTTGCGACAGCAACAGGTG
GAGGAAAAAGCAAATCAATACCTTCGTTATTCTCAACCAAATGCCATTAAATTGTGGATCCGATTATGAAAGAT
GATATCAAGGTCATGGACATCCTTCGCATCAATGGATTAAGCAAAAGAACTGGGAAGGTGCTGGCTATACCGATGT
TATCGGAGCCTTCGCACGTGGGGATGTCTCATGACACCAAATGGGTCTTGGGCGATCACAGCGATTAATGAACAAA
AACC GAAC TTTAAGATTGGGACCTTCATGATTCCAGGAAAAAGAAAGGACAAAGCTTAACCGTTGGTGC GGAGAC
25 TTGGCATGGTCTATCTCAGCCACCACCAAACATCCAAAAGAGCCAATGCCTTTGTGGAATATATGACCCGTCCAGA
AGTCATGCAAAAATACTACGATGTGGACGGATCTCCAACAGCGATCGAAGGGGTCAAACAAGCAGGAGAAGATTAC
CGCTTGCTGGTATGACCGAATATGCCTTTACGGATCGTCACTTGGTCTGGTTGCAACAATACTGGACAGTGAAGCA
GACTTCCATACCTTGACCATGAACTATGTCTTGACCGGTGATAACAAGGCATGGTCAATGATTTGAATGCCTTCTT
TAACCCGATGAAAGCGGATGTGGATTAG

30 MEWYKKIGLLATTGLALFGLGACSNYGKSADGTVTIEYFNQKEMTKTLEEITRDFEKENPKIKVKVNVNPNAGEVL
KTRVLAGDVPDVVNIYQPSIELQEWAKAGVFEDLSNKDYLRVKNGYAEKYAVNEKVYNVPFTANAYGIYNNKDFE
ELGLKVPETWDEFELVKD I VAKGQTPFGIAGADAWTLNGYNQLAFATATGGGKEANQYLYRSQPNAIKLSDPIMKD
DIKVM DILRINGSKQKNWEGAGYTDVIGAFARGDVLMTPNGSWAITAINEQKPNFKIGTFMIPGKEKGQSLTVGAGD
35 LAWSISATTKHPKEANAFVEYMTREVMQKYDVGDSPTAIEGVKQAGEDSPLAGMTEYAFTRHLVLWLQYWTSEA
DFHTLT MNVYLTGD KQGMVNDLNAFFNPMKADVDZ

40 ID207 - 4123.1

ATGAAGAAAATCAAACCGCATGGACCGTTACCAAGTCAGACTCAGCTAGCTTATCTGGGAGATGAACTAGCAGCTTT
TATCCACTTCGGTCCTAATACCTTTTATGACCAAGAATGGGGGACTGGACAGGAGGATCCTGAGCGCTTTAACCCGA
45 GTCAGTTGGATGCGCGTGAGTGGGTTCTGTGTCTCAAGGAAACGGGCTTCAAAAAGTTGATTTTGGTGGTCAAGCAC
CACGATGGCTTTGTCTTTATCCGACAGCTCACACAGATTATTCGGTTAAGGTCAAGTCTTGAGGAGAGAGAAAGGG
CGACTTGCTCCTTGAAGTATCCCAAGCTGCCACAGAGTTTGATATGGATATGGGGGTCTACCTGTCCCGTGGGATG
CCCATAGTCCCCTCTATCATGTGGACCGAGAAGCGGACTACAATGCCTATTATCTGGCTCAGTTGAAGGAAATCTTA
TCAAATCCTAACTATGGGAATGCTGGTAAGTTCGCTGAGGTTTGGATGGATGGTGCCAGAGGAGAGGGCGCGCAAAA
GGTTAATTATGAATTTGAAAAATGGTTTGAAACCATTCGTGACCTGCAGGGCGATTGCTTGATTTTTTCAACAGAAG
50 GCACCAAGTATCCGCTGGATTGGCAATGAACGAGGGTATGCAGGTGATCCACTGTGGCAAAAGGTGAATCCGTATAAA
CTAGGAACAGAAGCAGAGCTGAACTATCTTCAGCACGGGGATCCCTCGGGCACGATTTTTTCAATCGGAGAGGCAGA
TGTTTTCCATCCGTCCAGGCTGGTTCTACCATGAGGATCAGGATCCTAAGTCTCTCGAGGAGTTGGTCCGAATCTACT
TTCACTCAGTAGGGCGAGGAACCTCACTCTTGCTTAATATCCGCCGAATCAAGCTGGGCTCTTTGATGCAAAGGAT
ATTGAACGACTTTATGAATTTGCGACCTATCGCAATGAGCTCTATAAAGAAGATTGGCTCTGGGAGCTGAGGTATC
TGGTCCAGCTCTTTCCGCAGACTTTGCTTGTCGCCATTGACAGACGGCTTGAGACCAGCTCTTGGGCAAGCGATG
CAGACTTGCCCTCAGTTAGAACTCGACTTAGGTTCTCTAAAACCTTTGATGTAATTGAGTTAAGAGAAGATTG
55 AAGCTTAGGCAACGAATCGCTGCTTTTATGTGCAAGTAGGATGGATGGTGTCTGGCAGGAGTTGGTTCCGGGTCA
TACTGTTGGTTACAAACGCTCTTTACGAGGAGCAGTTGTTGAGGCACAGAAGATACGTGTAGTCATTACAGAATCAC
AGGCTTTGCCTTTGTTGACCAAGATTTCCCTTTATAAACTCCTGGATTATCAAAAAAGAAAGTTGTTCAAGAACTA
GCATTTGCAGAAAAAGCCTAGCTGTGGCAAAGGGAGAAAAATGCCTATTTTACAGTTAAGCGCAGAGAATGTAGTGG
TCCTTTAGAAGCTAAGATTTTCGATTCAACCGGGACAGGTGTCATGGTGTGCGCTATCAGGATGAGATTCAAGTCC
TTGCGTTTCAAACCTGGTGAGACTGAAAAAGTCTGACGCTACCAACCTTGTATTTTCGAGGAGATAAAACCTTGGAT
60 TTCTATCTGAACCTAACGGTGGATGGTCAGCTTGTGGATCAACTTCAAGTCCAAGTTTCATAA

MKKIKPHGPLPSQTLAYLGDELAAFIHFGPNTFYDQEWGTGQEDPERFNPSQLDAREWVRVLKETGFKKLILVVKH
HDGFVLYPTAHTDYSVKVSPWRRGKGDLLLEVSQAATEFDMDMGVYLSPWDHSPLYHVDREADYNAYYLAQLKEIL
SNPNYGNAGKFAEVWMDGARGEGAQKVNYEFKWFETIRDLQGDCLIFSTEGTSIRWIGNERGYAGDPLWQKVNPDK
5 LGTEAELNYLQHGDPSGTIFSIGEADVSIRPGWIFYHEDQDPKSLEELVEIYFHSVGRGTPLLLNIPPNQAGLFDKAD
IERLYEFATYRNELYKEDLALGAEVSGPALSADFACRHLTDGLETSSWASDADLP IQLELDLGSPKTFDVI ELREDL
KLGQRIAAFHVQVEVDGVWQEFSGHTVGYKRLLRGAVVEAQKIRVVITESQALPLLTKISLYKTPGLSKKEVVQEL
10 AFAEKSLAVAKGENAYFTVKRRECSGP LEAKISIQPGTGVHGVAYQDEIQVLAFTGETEKS LTLPTLYFAGDKTLD
FYLNLTVDGQLVDQLQVQVSZ

ID208 - 4125.12

ATGCTTGAAAGACTGAAAAGAATACATTATATGTTTTGGATCAGTTTAATTTTTATGATTTTCCCCATCCTGTCTGT
AGTGACTGGGTGGCTTTCTGCCTGGCATTATTGATTGATATTCTATTGTAGTGGCATATTTGGGTGTTTTAACAA
CTAAGAGCCAGCGCCTATCTTGGCTATATTGGGGCCTCATGCTGACTTATGTAGTTGGGAATACTGCCTTTGTGTCT
15 GTTAATTATATCTGGTTTTCTTTTTCTATCCAATCTCTTAAGTTATCATTTACAGCTACGTAGTTTAAAGTCTTT
ACATGTCTGGACTTTTTCTTGTCTCAAGTCTTGTGTGGGGCAACTGTTGATTTTTACAGAAATCGAAGTTGAGT
TTCTATTCTATCTACTTGAATTCTTACTTTTGTGCGATTAAATGACTTTTGGATTGGTTCGGATTCTGATTGTGCGAG
GATTTGAAAGAAGCTCAGGTCAAGCAAAATGCTCAGATAAATCTATTGCTTGCTGAAAATGAACGTAGTCGTATCGG
20 TCAGGATTTGCATGATAGTCTGGGACATACCTTTGCTATGCTGAGTGTCAAGACAGATTAGCCTTGCAAGTTATTTT
AGATGGAGGCTTATCCACAGGTGGAAGAATTAAGAAGAAATTCACCAGATCAGCAAGGATCCATGA

MLERLKRIHYMFWISLIFMIFPILSVVTGWLSAWHLLIDILFVVAYLGVLTTKSQRLSWLYWGLMLTYVVGNTAFVA
VNYIWWFFFLSNLLSYHFSVRSLKSLHVWTFLLAQVLVVGQLLIFQRIEVEFLFYLLVILTFVDLMTFGLVRIRIVE
25 DLKEAQVKQNAQINLLAENERSRIGQDLHDSLGHFTFAMLSVKTDLALQLFQMEAYPQVEKELKEIHQISKDPZ

ID209 - 4126.3

ATGAATGATAAGTTAAAAATCTTCTTGTGCTAGGAGTATTTTTCTAGCCATAACCGGTTTCTATGTTCTATTGAT
ACGAAATGCAGGGCAGACAGATGCCTCGCAAATGAAAAGCGCGCAGTTAGCCAAGGAGGAAAAGCAGTGAAAAAAA
30 CAGAAATTAGTAAAGACGCAGACTTGCACGAAATTTATCTAGCTGGAGGTTGTTTCTGGGGAGTGAGGAATATTTT
TCACGTGTTCCCGGGGTGACGGATGCCGTTTTCAGGCTATGCAAATGGTAGAGGAGAAACAACCAAGTACGAATTGAT
TAACCAAAACAGGTATGCAGAAACCGTCCATGTACCTATGATGCCAAGCAAATTTCTCTCAAGGAAATCCTGCTTC
ACTATTTCCGCATTATCAATCCAACCAGCAAAAATAACAAGGAAATGATGTGGGGACCCAGTACCGTACTGGTGT
TATTACACAGATGACAAGGATTTGGAAGTGATTAACCAAGTCTTTGATGAGGTGGCTAAGAAATACGATCAACCTCT
35 AGCATTGAAAAGGAAAACTTGAAGAATTTGTGGTGGCTGAGGATTACCATCAAGACTATCTCAAGAAAAATCCAA
ATGGCTACTGCCATATCAATGTTAATCAGGCGGCCTATCCTGTGATTGATGCCAGCAAATATCAAAAACCAAGTGAT
GAGGAATTGAAAAGACCTGTACCTGAGGAGTATGCAGTTACCCAGGAAAATCAAACAGAACGAGCTTTCTCAA
CCGTTACTGGGATAAATTTGAATCCGGTATCTATGTGGATATAGCAACTGGGGAACCTCTCTTTTCATCAAAAAGACA
AATTTGAGTCTGTTGTGGTGGCTGAGCTAGTTTACCACCCATCAGTCCAGATGTTGTACCTCAAGGAAGATAAG
40 TCCTACAATATGACGCGTATGGAAGTGGGAGCCGAGTAGGAGATTCTCACCTTGGGCATGTCTTACGGATGGTCC
ACAGGACAAGGGCGGCTTACGTTACTGTATCAATAGCCTCTCTATCCGCTTTATTCCCAAAGACCAAATGGAAGAAA
AAGgcTACGCTTATTTACTAGATTATGTTGATTAA

MNDKLFIFLLLVFFLAITGFYVLLIRNAGQTDASQIEKAASVQGGKAVKKTEISKDADLHEIYLAGGCFWGVVEEYF
SRVPGVTDVAVSGYANGRGETTKYELINQTHAETVHVITYDAKQISLKEILLHYFRIINPTSKNKQGNVDVGTQYRTGV
YYTDDKDLVINQVFDEVAKKYDQPLAVEKENLKNFVVAEDYHQDYLLKNPNNGYCHINVNQAAYPVIDASKYPKPSD
EELKKTLSPEEYAVTQENQTERAFSNRYWDKFESGIYVDIATGEPLFSSKDKFESGCGWPSFTQPI SPDVVITYKEDK
50 SYNMTRMEVRSRVGDSHLGHVFTDGPQDKGGLRYCINSLSIRFIPKQMEKGYAYLLDYVDZ

ID210 - 4127.1

ATGAAAAAGAAATGGATGTATTATGCTGCTTGTCTTCTAATGAATCTGCCGATGACAGTTTATCTGATAAAGGAGA
CGGCGGTTTCGCTAGTCGTTTATTCACCAAACCTCAGAGGGCTTAATTGGAGCAACTATTCTGCTTTGAAGAAAAAT
ATGGTATCAAAGTAGAACTGATTCAAGCTGGTACTGGAGAAGCTTTTCAAAAACTAGAGTCAGAAAAAGAAGTTCTCT
55 GTAGCTGATGTTATCTTTGGTGGTCTTATACACAATATACTACCCACGGAGAACTCTTTGAAAACTATACTTCAA
AGAAAATGATAATGTTATCAAAGAATATCAAAACACAACCTGGCTACTCTACTCTTATACACTAGATGGTAGTGT
TAATCGTCAACCTGATTTAACTAAAGGCATGAACATCGAAGGATATAACGATCTTTTCAAACCTGAACATAAAGGA
AAAATCGCAACTGCTGACCCAGCAAACCTCTTAGCGCCTTTGCTCAATTAACAAATATGCTACAAGCTCAAGGTGG
TTACAAAGATGATAAGGCTTGGTCTTATGTAAAGATCTTTTCACTTATTGATGGTAAATCGGTTCAAGTTTAT
60 CTAGTGTCTATAAAGTAGTCGCTGATGGAGAAATGGCTGTTGTCTCTCTTATGAAGATCCAGCAGTTAACTCTTA

AATGACGGAGCTAACATTAAGGTAGTCTATCCAAAAGAAGGAACCGTCTTCTACCTGCTAGTGCTGCTATCGTTAA
AAAATCTAAAAATATGGAATGCCAAGAAATTTATCGATTTTATTATCTCTCAAGAAGTACAAGATACACTTGGA
CAACCACTACTAACCGTCTCTGTTTCGTAAAAATGCTAAAAACAAGCGAAAAACATGAAACCAATTGACAAAATCAAAACA
CTCACTGAAGATTATGATTATGTCATCAAGAATAAATCAGATATCGTTAAGAAATACAACGAAGTCTTTACAGATAT
CCAATCTAAACAGTAA

MKKKWMYYAACSSNESADSSSDKGDGGSLLVYSPNSEGLIGATIPAFEEKYGIKVELIQAGTGELFKKLESEKEVP
VADVIFGGSYTOYTTGELFENYTSKENDNVIKEYQNTTGYSTPYTLDGSVLIVNPDLTGKMNIEGYNDLFLKPELKG
KIATADPANSSSAFAQLTNMLQAQGGYKDDKAWSYVKDLFTLIDGKIGSSSSSVYKVVADGEMAVGLSYEDPAVKLL
NDGANIKVVYPKEGTVFLPASAAIVKSKNMENAKKFIDFIISQEVQDTLGTTTTNRPVRKNAKTSENMKPIDIKIT
LTEDYDVYIKNKSIVKKYNEVFTDIQSKQZ

ID211 - 4127.2

ATGAGTGAGATCAAAATTATTAACGCCAAAAAATCTACCACGATGTCCCTGTTATTGAGAATTTGAACATTACAAT
TCCAAAAGGAAGTCTCTTTACCTTCTTGGAGCTTCAGGATGTGGGAAAACGACCTTCTTCGTATGATTGCAGGTT
TCAACAGTATCGAAGGTGGAGAATTTTACTTCGATGATACAAAAATCAATAATATGGAACCCAGCAAAACGCAATATC
GGGATGGTTTTCCAAAACACTACGCTATTTTCCACATTTGACTGTCCGAGACAACGTTGCTTTTGGTCTTATGCAAAA
GAAGGTTCCAAAAGAAGATTGATTCAACAGACCAACAAGTATCTTGAACATGCAAAATTGCTCAATATGCGGATC
GAAAGCCCGATAAACTCAGTGGTGGACAACAACAACGTGTACCTTGGCATGCGCCTTAGCGGTTAATCCAAGTGTT
CTCTCATGGACGAGCCACTTAGTAATCTGGAGGCCAACTTCGCTTGGATATGCGTCAAGCCATCCGAGAAATCCA
ACACGAAGTGGGAATTACAACCTGTTTATGTAACCCACGACCAAGAAGAAGCCATGGCTATTTTCAGACCAAAATTGCTG
TTATGAAAGATGGGGTGATCCAACAATCGGCCGACCAAAAAGAACTCTATCATAAACCAGCTAATGAGTTTGTGGCA
ACCTTTATCGGACGCACAAATATTATCCCTGCCAATCTTGAAAAACGGAGCGACGGCGCTTATATCGTCTTTTCAGA
TGGCTATGCCCTTCGAATGCCAGCTCTTGATCAGGTTGAGGAGCAAGCTATTATGTAAGCATTTCGTCGCCGAAGAGT
TTATCAAAGATGAATCTGGAGATATTGAAGGAATATTAGAGATAGCGTCTATCTTGGACTAAATACGGATTATTTC
ATTGAGACAGGTTTTGCCTCAAAAATCAAGTTAGTGAAGAATCAACTTTTGAAGAAGATCTACAAAAAGGCAATCG
TATTCGTCTACGAATCAATACGCAAAAATTAACATCTTTCTGCAGATGGTTCCCAAAACCTGATAAAAGGAGTCA
ACCATGGAACGTAA

MSEIKIINAKKIYHDPVPIENLNIIPKGSFLTLLGASGCGKTTLLRMIAGFNSIEGGEFYFDDTKINMEPSKRNI
GMVFQNYAIFPHLTVRDNVAFGLMQKVPKEELIQQNTKYLELMQIAQYADRKPKDLSGGQQQRVTLACALAVNPSV
LLMDEPLSNLEAKRLDMRQAIREIQHEVGITTVYVTHDQEEAMASDQIAVMKDGVIQQIGRPKELYHKPANEFVA
TFIGRTNIIIPANLEKRSBGAYIVFSDGYALRMPALDQVEEQAIHVSIRPEEFIKDESGLIEGTIRDSVYLGINTDYF
IETGFASKIQVSEESTFEEDLQGNRIRLRINTQKLNIFSDGSQNLIKGVNHGTZ

ID212 - 4136.1

ATGAAGAAAAAATTATTGGCAGGTGCCATCACACTATTATCAGTAGCAACTTTAGCAGCTTGTTTCGAAAGGGTCAGA
AGGTGCAGACCTTATCAGCATGAAAGGGGATGTCAATTACAGAACATCAATTTTATGAGCAAGTGAAAGCAACCTTT
CAGCCCAACAAGTCTTGTTAAATATGACCATCAAAAAGTTTTTGA AAAACAATATGGCTCAGAGCTTGATGATAAA
GAGGTTGATGATACTATTGCCGAAGAAAAAAAACAATATGGCGAAAACCTACCAACGTGTCTTGTCACAAGCAGGTAT
GACTCTTGAAACACGTAAAGCTCAAATTCGTACAAGTAAATTAGTTGAGTTGGCAGTTAAGAAGGTAGCAGAAGCTG
AATTGACAGATGAAGCCTATAAGAAAGCCTTTGATGAGTACACTCCAGATGTAACGGCTCAAATCATCCGTCTTAAT
AATGAAGATAAGGCCAAAGAAAGTTCTGAAAAAGCCAAGGCAGAAGGTGCTGATTTTGCTCAATTAGCCAAAGATAA
TTCAACTGATGAAAAACAAAAGAAAATGGTGGAGAAATTACCTTTGATTCTGCTTCAACAGAAGTACCTGAGCAAG
TCAAAAAGCCGCTTTTCGCTTTAGATGTGGATGGTGTCTTGATGTGATTACAGCAACTGGCACACAAGCCTACAGT
AGCCAATATTACATTGTA AAACTCACTAAGAAAACGAAAAATCATCTAATATTGATGACTACAAAGAAAAATTA
AACTGTTATCTTGACTCAAAAACAAAATGATTCAACATTTGTTCAAAGCATTATCGGAAAAAGAAATTGCAAGCAGCCA
ATATCAAGGTTAAGGACCAAGCCTTCCAAAATATCTTTACCCAATATATCGGTGGTGGAGATTCAAGCTCAAGCAGT
AGTACATCAAACGAATAG

MKKKLLAGAITLLSVATLAACSKGSEGADLISMKGDVITEHQFYEQVKSNSAQQVLLNMTIQKVFEKQYGSSELDDK
EVDDTIAEEKKQYGENYQRVLSQAGMTLETRKAQIRTSKLVELAVKKVAEAELTDEAYKKAFFEYTPDVTAQIIRLN
NEDKAKEVLEKAKAEGADFALAKDNSTDEKTKENGGEITFDSASTEVPEQVKKAFAFDVGDVSDVITATGTQAYS
SQYYIVKLTKKTEKSSNIDYKEKLKTVILTQKQNDSTFVQSIIGKELQAANIKVKDQAFQNIPTQYIGGGDSSSSS
STSNEZ

ID213 - 4137.3

ATGAAAAAAAAATATTAAACAATATGTAACTTAGGTACTGTAGTGGTATTATCAGCATTGTGCTAACTCAGTTGC
AGCTCAGGAGACTGAAACTTCTGAAGTATCAACACCAAAGTTGGTGCAACCTGTTGCACCAACGACTCCGATTTCGG
AAGTACAACCTACATCGGATAACTCTTCGGAAGTTACTGTACAACCTCGAACAGTTGAACTACTGTAAAGGATCCA
TCTTCTACAGCGGAAGAACTCCTGTCTTAGAAAAAATAATGTTACTTTAACAGGGGGCGGAGAAAATGTTACTAA
AGAGTTAAAGGATAAATTTACTAGCGGTGACTTTACTGTAGTGATTAAGTACAATCAGTCAAGTGAGAAAGGCTTAC
AAGCTCTGTTTGGAAATATCTAATTCCAAACCCGGTCAACAAAATAGTTATGTAGATGTGTTCCCTTAGAGACAATGGT
GAGTTGGGGATGGAAGCGCGTGATACTTCTTCCAATAAAAAATAACCTAGTATCCAGACCTGCTTCAGTTTGGGGTAA
GTACAAACAAGAGGCTGTGACTAACACTGTTGCAGTAGTAGCAGATTTCAGTCAAAAAACATATTCTTTATACGCAA
ATGGTACAAAAGTAGTAGAAAAGAAAGTGGATAATTTCTTAAACATCAAGGATATTAAAGGTATTGATTACTATATG
CTTGGGGGAGTGAAACGTGCAGGAAAAACGGCGTTTGGTTTAAACGGAACACTAGAAAATATCAAATCTTTAATAG
TGCTTGGATGAAGAACTGTTAAAAAGATGACAACAAACGCTGTTACTGGACATTTAATTTATACGGCTAATGATA
CAACAGGTCTTAATACTATTCCGTATTCCAGTTCTGTATACTTTTAGCAATGGTCGGGTATTTTCAAGCATTGACGCT
CGTTACGGTGGAACCTCATGATTCTTGAATAAAATTAATATTGCTACAAGTTATAGTGATGATAATGGTAAGACATG
GACTAAACCAAAATTAACATTGGCATTTCGATGATTTTGCGCCAGTACCATTAGAATGGCCTCGTGAAAGTTGGTGGAC
GTGACTTACAAATCAGCGGTGGTGCAACCTATATTGACTCTGTTATTGTTGAAAAAAGAACAACAAGTACTCATG
TTTGCTGATGTGATGCCTGCTGGAGTAAGTTTATAGAGAAGCAACTAGAAAAGATTTCAGGTTATAAACAAATTTGATGG
TAATTATTACCTTAAATTAAGGAAACAAGGTGATACTGATTACAATTATACTATTTCGTGAGAATGGTACTGTATACG
ACGATCGTACCAACAGACCAACTGAATTTTCAGTAGATAAAAATTTTCGGTATTAAACAAAATGGTAATTATTTGACG
GTAGAGCGG

MKKNIKQYVTLGTVVVLSAFVANSVAAQETETSEVSTPKLVQPVAPTPPISEVQPTSDNSSEVTVQPRVETTVKDP
SSTAETPVLEKNNVTLTGGENVTKEKDKFTSGDFTVVIKYNQSSSEKGLQALFGISNSKPGQONSVDVFLRDNG
ELGMEARDTSSNNKLVSRPASVWGKYKQEAVENTVAVVADSVKKTYSLYANGTKVVEKKVDNFLNFKDIKGIIDYYM
LGGVKRAGKTAFGFNGTLENIKFNSALDEETVKKMTTNAVTHGLIYTANDTTGSNYFRIPLVLYTFSNGRVFSSIDA
RYGGTHDFLNKINIATSYSDDNKGTWTKPKLTLAFDDFAPVPLEWPREVGGRLQISGGATYIDSVIVEKKNKQVLM
FADVMPAGVSFREATRKDSGYKQIDGNYLKLKQGD TDYNYTIRENGTVYDDRTNRPTEFSVDKNFGIKQNGNYLT
VER

ID214 - 4185

ATGAAAAAATTTAGCCTATTACTAGCTATCCTACCATTTTGGTTGCTGTGAGAATCAAGTACACCCAAAGAGAC
TAGCGCTCAAAGACAATCGTCCTTGCTACAGCTGGCGACGTGCCACCATTGACTACGAAGACAAGGGCAATCTGA
CAGGCTTTGATATCGAAGTTTAAAGGCAGTAGATGAAAACTCAGCGACTACGAGATTCAATTCCAAAGAACCGCC
TGGGAGAGCATCTTCCCAGGACTTGATTCTGGTCACTATCAGGCTGCGGCCAATAACTTGAGTTACACAAAAGAGCG
TGCTGAAAAATGACCTTTACTCGCTTCCAATTTCCAACAATCCCCTCGTCCTTGTGAGCAACAAGAAAAATCCTTGA
CTTCTCTTGACCAGATCGCTGGTAAACACACAAGAGGATACCGGAACCTCTAACGCTCAATTCATCAATAACTGG
AATCAGAAACACACTGATAATCCCGCTACAATTAATTTTCTGGTGAGGATATTGGTAAACGAATCCTAGACCTTGC
TAACGGAGAGTTTGATTTCTTAGTTTTTGACAAGGTATCCCTTCAAAGATTATCAAGGACCGTGGTTTAGACCTCT
CAGTCGTTGATTTACCTTCTGCAGATAGCCCCAGCAATTATATCATTCTCAAGCGACCAAAAAGAGTTTAAAGAG
CAATTTGATAAAGCGCTCAAAGAACTCTATCAAGACGGAACCCCTTGAAAACTCAGCAATACCTATCTAGGTGGTTC
TTACCTCCCAGATCAATCTCAGTTACAATAA

MKKFSLLLAILPLFVACENQATPKETSAQKTIVLATAGDVPPFDYEDKGNLTGFDIEVLKAVDEKLSDYIEIQFORTA
WESIFPGLDSGHYQAAANNLSYTKERAELYLSLPI SNPLVLVSNKKNPLTSLDQIAGKTTQEDTGTSNQF INNW
NQKHTDNPATINFSGEDIGKRILDLANGEFDLFLVDKVSQKIKDRGLDLSVVDLPSADSPSNYIIFSSDQKEFKE
QFDKALKELYQDGTLEKLSNTYLGGSYLPDQSQLQZ

ID215 - 4211.1

ATGAAAAAATAGTTTATATATCATATCCTCACTCTTTTGTGCTGTGCTTATTGTTCTATGCTACGGCGACGAA
TTTTCAAACAGTACCAGTGCTAGGCAGGTAAAAACGGAAACCTATACTAATACAGTAACAAATGTCCCTATTGACA
TACGCTATAATAGTGATAAGTATTTTATTAGCGGTTTTGCTTCAGAAGTATCAGTGGTCTTGACTGGTGCAATCGC
CTATCGCTAGCTAGTGAAATGCAAGAAAGTACACGTAAATTCAGGTTACTGCTGACCTAACAGATGCCGGTGTG
AACGATTGAAGTTCCTTTGAGCATTGAAGATTTACCCAATGGGCTGACCGCTGTGGCGACTCCGCAAAAAATTACAG
TCAAGATTGGTAAGAAGGCTCAGAAGGATAAGGTAAAGATTGTACCAGAGATTGACCCTAGTCAAATTGATAGTCGG
GTACAAATTGAAAATGTCATGGTGTGAGATAAAGAAGTGTCTATTACGAGTGACCAAGAGACATTGGATAGAAATTGA
TAAGATTATCGCTGTTTTGCCAACTAGCGAACGTATAACAGGTAATTACAGTGGTTTACGTACCTTTGCAGGCAATCG
ACGCAATTGAGTGTCTTACCGGCAGTTATCACTCCGTTTGATACAATAATGAAGGTGACTACAAAACAGTAGCA
CCAAGTTCAAGCACATCAAATTCAGTACAAGCAGTTTCATCGGAGACATCTTCGTCAACGAAAGCAACTAGTTCAAA
AACGAATTAA

5 MKKNSLYIISSLFFACVLFFVYATATNLFQNSTSARQVKTEYNTNTVNPIDIRYNSDKYFISGFASEVSVVLTGANR
LSLASEMQESTRKFKVTADLTAGVGTIEVPLSIEDLPNGLTAVATPQKITVKIGKKAQKDKVKIVPEIDPSQIDSR
VQIENVMSVDEKVSITSDQETLDRIDKIIAVLPTSERITGNYSGSVPLQAI DRNGVVLPAVITPFDTIMKVTTKPVA
PSSSTSNSSSTSSSSETSSSTKATSSSKTNZ

ID216 - 4127.3

10 ATGTTGATTGGCGAAGGGTATCGGACTTTCCCTGTCTGATTTATACCCAATTTATTAGCGAGGTTGGAGGAAATTC
TGCTTTTGCAATTATGGCGATTATCATTGCCTTGGAATTTTCCTTATCCAAAACACATTGCAAACCGCTACAGTT
TCAGCATGAATCTGCTCCATCCAATTGAGCCTAAAAAACTACAAAAGGAAAAATGGCTGCCATTTATGCAACAGTC
TACGGAATTATCTTTATCTCTGTTTTACCTCAAATCTACTTAATTTATACCTCTTTCCTAAAAACATCAGGTATGGT
ATCTGTTAAAGGTTATTCTCCAAACAGTTACAAGGTAGCTTTCCATCGTATGGGATCTGCTATTTTCAATACCATT
GTATCCCTTTGATTGCCTTAGTTCTAGTTGTTCTATTTGCGACATTTATCTCCTACCTAGCCGTTAGAAAACGGAAT
15 TTGTTTACAACTTAATTGACAGCCTCAGTATGGTACCTTATATTGTACCAGGAACCGTTCTAGGGATTGCCTTCAT
TTCTTCCTTCAATACTGGTCTATTTGGAAGTGGATTTCTTATGATTACAGGGACTGCTTTCATCTTGATTATGTCTC
TATCTGCCAGAAGATTACCTTATACTATTGCTCATCTGTTGCTAGCTTACAACAAATAGCACCAAGTATTGAAGAA
GCTGCTGAAAGCTTAGGAAGTAGTCGTCTCAATACCTTTGCTAAGATTACAACCTCAATGATGCTATCTGGTATCAT
TTCTGGAGCCATCTTATCTTGA

20 MLIGEGYRTFPVLIYTQFISEVGGNSAFAIMAI IIALAIFLIQKHIANRYSFSMNLLHPIEPKKTTKGKMAAIYATV
YGIIFISVLPQIYLIYTSFLKTSGMVSVKGYSPNSYKVAFHRMGSAIFNTIRIPLIALVLVVLFFATFISYLAVRKRN
LFTNLIDSLSMVPYIVPGTVLGIAFISSFNTGLFGSGFLMITGTAFILIMSLSARRLPYTIRSSVASLQQIAPSIEE
25 AAESLGSSRLNTFAKITTPMMLSGIISGAILSZ

ID301

35 MNKKKMILTSLASVAILGAGFVTSQPTFVRAEESPQVVEKSSLEKKYEEAKAKADTAKKDYETAKKKAEDAQKKYED
DQKRTEEKARKEAEASQKLNDAVLVVQNAVKEYREVQNQRSKYKSDAEYQKKLTEVDSKIEKARKEQQDLQNKFNVEV
RAVVVPEPNLAETKKKAAEEAKAEEKVAKRKYDYATLKVALAKKEVEAKELET EKLQYEIISTLEQEVATAQHQVNDL
KLLLAGADPDDGTEVIEAKLKKGEAELNAKQAEALAKKQTELEKLKLDLSDPEGKTQDELDKEAEAEELDKKADELQNK
40 VADLEKEISNLEIILGGADPEDDTAALQNKLAACKAEALAKKQTELEKLKLDLSDPEGKTQDELDKEAEAEELDKKADE
LQNKVADLEKEISNLEIILGGADSEDDTAALQNKLATKKAELKTKQKELDAALNELGPDGDEEETPAPAPQPEQPAP
APKPEQPAPAPKPEQPAPAPKPEQPAPAPKPEQPAPAPKPEQPAKPEKPAEEPTQPEKPATPKTGWKQENGMMWYFYN
TDGSMAGWLQNNGSWYYLNGANGMATGWVKDGD TWYYLEASGAMKASQWFKVSDKWYYVNSNGAMATGWLQYNGSW
YYLNGADSMATGWLQYNGSWYYLNGANGMATGWAKVNGSWYYLNGANGMATGWAKVNGSWYYLNGANGMATGWVKDG
DTWYYLEASGAMKASQWFKVSDKWYYVNGLGALAVNTTVDGYKVNANGEWVZ

ID302

ATGTTTGCATCAAAAAGCGAAAGAAAAGTACATTATTCAATTCTGTAATTTAGTGTGGAGTAGCTAGTGTAGTTGT
TGCCAGTCTTGTTATGGAAGTGTGGTTCATGCGACAGAGAACGAGGGAGCTACCCAAGTACCCACTTCTTCTAATA
GGGCAAAATGAAGCTCAGGCAGAACAGAGAGAACCACTTAAAAAAGTTCGATTGAGAACGAGATAAGGCAAGGAAAGAG
50 GTCGAGGAATATGTAAAAAATAGTGGGTGAGAGCTATGCAAAATCAACTAAAAAGCGACATCAATTACTGTGTAGC
TCTAGTTAACGAGTTTGAACAACATTAAAGAACGAGTATTGTAATAAAATAGTTGAATCAACTCAGAAAGCCAACTAC
AGATACTGATGATGGAGAGTCGATCAAAAGTAGATGAAGCTGTGTCTAAGTTTGAAGAGGACTCATCTTCTTCGTCA
AGTTCAGACTCTTCCACTAAACCGGAAGCTTCAGATACAGCGAAGCCAAACAAGCCGACAGAACAGGAGAAAAGGT
AGCAGAAGCTAAGAAGAAGGTTGAAGAAGCTGAGAAAAAGCCAAGGATCAAAAAGAAGAAGATCGTCTGAACCTACC
55 CAACCATTACTTACAAAACGCTTGAACCTGTAATGCTGAGTCCGATGTGGAAGTTAAAAAGCGGAGCTTGAACATA
GTAAAAGTGAAAGCTAACGAACCTCGAGACGAGCAAAAAATTTAAGCAAGCAGAAGCGGAAGTTGAGAGTAAACAAGC
TGAGGCTACAAGGTTAAAAAATCAAGACAGATCGTGAAGAAGCAGAAGAAGAAGCTAAACGAAGAGCAGATGCTA
AAGAGCAAGGTAACCAAGGGCGCGGCAAAACGAGGAGTCTCTGGAGAGCTAGCAACACCTTGATAAAAAAGAAAAAT
60 GATGCGAAGTCTTCAGATTCTAGCGTAGGTGAAGAAACTCTTCCAGCCCATCTCTGAAACCAAGAAAAAGGTGAGC
AGAAGCTGAGAAGAAGGTTGAAGAAGCTAAGAAAAAAGCCGAGGATCAAAAAGAAGAAGTACGCGGTAACTACCCA

CCAATACTTACAAAACGCTTGAACCTTGAAATTGCTGAGTCCGATGTGGAAGTTAAAAAGCGGAGCTTGAAGTAGTA
AAAGAGGAAGCTAAGGAACCTCGAAACGAGGAAAAAGTTAAGCAAGCAAAAGCGGAAGTTGAGAGTAAAAAGCTGA
GGCTACAAGGTTAGAAAAATCAAGACAGATCGTAAAAAGCAGAAGAAGCTAAACGAAAAGCAGCAGAAGAAG
5 ATAAAGTTAAAGAAAAACCAGCTGAACAACCACAACCAGCGCCGGCTCCAAAAGCAGAAAAACCAGCTCCAGCTCCA
AAACCAGAGAATCCAGCTGAACAACCAAAAGCAGAAAAACCAGCTGATCAACAAGCTGAAGAAGACTATGCTCGTAG
ATCAGAAGAAGATATAATCGCTTGACTCAACAGCAACCGCCAAAAACTGAAAAACCAGCACAAACCATCTACTCCAA
AAACAGGCTGGAAAAACAAGAAAACGGTATGTGGTACTTCTACAATACTGATGGTTCAATGGCGACAGGATGGCTCCAA
AACAATGGCTCATGGTACTACCTCAACAGCAATGGCGCTATGGCGACAGGATGGCTCCAAAACAATGGTTCATGGTA
10 CTATCTAAACGCTAATGGTTCAATGGCAACAGGATGGCTCCAAAACAATGGTTCATGGTACTACCTAAACGCTAATG
GTTCAATGGCGACAGGATGGCTCCAATACAATGGCTCATGGTACTACCTAAACGCTAATGGTTCATGGCGACAGGA
TGGCTCCAATACAATGGCTCATGGTACTACCTAAACGCTAATGGTGATATGGCGACAGGTTGGGTGAAAGATGGAGA
TACCTGGTACTATCTTGAAGCATCAGGTGCTATGAAAGCAAGCCAATGGTTCAAAGTATCAGATAAATGGTACTATG
TCAATGGCTCAGGTGCCCTTGCACTCAACACAACCTGTAGATGGCTATGGAGTCAATGCCAATGGTGAATGGGTAAAC
TAA

MFASKSERKVHYSIRKFSVGVASVVVASLVMGSSVHATENEGATQVPTSSNRANESQAEQGEQPKKLDSEDKARKE
VEEYVKKIVGESYAKSTKKRHTITVALVNELNNIKNEYLNKIVESTSESQILMMESRSKVDEAVSKFEKDSSSSS
SSDSSTKPEASDTAKPNKPTPEGEKVABAKKKVEEAEEKAKDQKEEDRRNYPTITYKLELEIAESDVEVKKAELEL
20 VKVKANEPREDEQIKQAEAEVESKQAEATRLKKIKTDREEABEEAKRRADAKEQKPKGRAKRGVPGELATPDKKEN
DAKSSDSSVGEETLPSPLKPEKKVAEAEKKVEEAEEKKAEDEQKEEDRRNYPTNTYKLELEIAESDVEVKKAELELV
KEEAKEPRNEEKVKQAKAEVESKKAETRLLEKIKTDREKAEAEAKRKAEEEDKVKEKPAEQPOPAPAPKAEKPAPAP
KPENPAEQPKAEKPADQQAEDYARRSEEEYNRLTQQQPPKTEKPAQPPSTPKTGWKQENGMWYFYNTDGSMTAGWLQ
NNGSWYYLNSNGAMATGWLQNNGSWYYLNANGSMATGWLQNNGSWYYLNANGSMATGWLQYNGSWYYLNANGSMATG
35 WLQYNGSWYYLNANGDMATGWVKDGDWTWYLEASGAMKASQWFKVSDKWYVNGSGALAVNTTVDGYGVNANGEWVN
Z

ID303

ATGGTAAAAAGACGTATAAGGAGAGGGACGAGAGAACCTGAAAAAGTTGTTGTTCTTGAGCAATCATCTATTCTCTTC
GTATCTGTATCTGTTACATCTAACCAAGGAACAGATGTAGCAGTAGAACAGCTAAAGCAGTTGCTCCAACAACAG
30 ACTGGAAACAAGAAAAATGGTATGTGGTATTTTATAAATACTGATGGTTCCATGGCAACAGGTTGGGTACAAGTTAAT
AGTTCATGGTACTACCTCAACAGCAACGGTTCTATGAAAGTCAATCAATGGTTCCAAGTTGGTGGTAAATGGTATTA
TGTAATAACATCGGGTGAGTTAGCGGTCAATACAAGTATAGATGGCTATAGAGTCAATGATAATGGTGAATGGGTGC
GTTAA

MVKRRIRRGRTREPEKVVPQSSIPSPVSVTSNQGTDVAVEPAKAVAPTTDWKQENGMWYFYNTDGSMTAGWVQVN
SSWYYLNSNGSMKVNQWFQVGGKWYYVNTSGELAVNTSIDGYRVNDNGEVRZ

ID304

CTGAATACAAGTTTTGTTTCATGCTGCTGATGGGATTCAATATGTGAGAGATGATACTAGAGATAAAGAAGAGGGAAT
40 AGAGTATGATGACGCTGACAATGGGGATATTATTGTAAGTAGCGACTAAACCTAAGGTAGTAACCAAGAAAAATTT
CAAGTACGCGAATTCGTTATGAAAAAGTGAACAAAAAGACCGTAGTGAAGTCTGTTACAATTGATGGAGAGGAT
GGCTATGTAACACGACAAGGACCTACGATGTTAATCCAGAGACTGGTTATGTTACCGAACAGGTTACTGTTGATAG
AAAAGAAGCCACGGATACAGTTATCAAAGTTCAGCTAAAAGCAAGGTTGAAGAAGTTCTTGTTCATTGCTACTA
45 AATATGAAGCAGACAATGACCTTTCTGCAGGACAGGAGCAAGAGATTACTCTAGGAAAGAATGGGAAAACAGTTACA
ACGATAACTTATAATGTAGATGGAAGAGTGGACAAGTAAGTGAAGTACTTTAAGTCAAAAAAAGACTCTCAAAC
AAGAGTTGTTAAAAAAGAACCAAGCCCCAAGTTCTGTGCAAGAAATCCAATCGAAACAGAATATCTCGATGGCC
CAACTCTTGATAAAGTCAAGAAGTAGAAGAAGTAGGAGAAATGGTAAATTACTCTTACTACAATCTTACTGTAG

LNTSFVHAADGIQYVRDDTRDKEEGIEYDDADNGDIIVKVATKPKVVTKKISSIRIYEKDETKDRSENPTVIDGED
50 GYVTTTTRTYDVPNETGYVTEQVTVDRKEATDTVIKVPKSKVEEVLVPFATKYEADNDLSAGQEIEITLGKNGKTVT
TITYNVGDKSGQVTESTLSQKKSQTRVVVKRTPKQVLVQEIPIETEYLDGPTLDKSQEVVEEVEIGKLLLLQSILZ

ID305

ATGAAGCTTTTGAAAAAATGATGCAAAATCGCACTAGCCACATTTTCTTCGGTTTGTAGCGACAAATACAGTATT
55 TGCAGATGATTCTGAAGGATGGCAGTTTGTCCAAGAAAAATGGTAGAACCTACTACAAAAGGGGGATCTAAAAGAAA
CCTACTGGAGAGTAGATAGGGAAGTACTATTATTTGATCCTTTATCCGGAGAGATGGTTGTGCGCTGGCAATAT
ATACCTGCTCCACACAAGGGGTTACGATTGGTCCTTCTCCAAGAAATAGAGATTGCTCTTAGACCAGATTGGTTTAA
60 TTTTGGTCAAGATGGTGTATTACAAGAATTTGTTGGCAAGCAAGTTTGTAGAGCAAAAACTGCTACGAATACCAACA
AACATCATGGGGAAGAATATGATAGCCAAGCAGAGAAACGAGTCTATTATTTGAAGATCAGCGTAGTTATCATACT

TTAAAACTGGTTGGATTTATGAAGAGGGTCATTGGTATTATTTACAGAAGGATGGTGGCTTTGATTCGCGCATCAA
CAGATTGACGGTTGGAGAGCTAGCACGTGGTTGGGTTAAGGATTACCCTCTTACGTATGATGAAGAGAAGCTAAAG
CAGCTCCATGGTACTATCTAAATCCAGCAACTGGCATTATGCAAACAGGTTGGCAATATCTAGGTAATAGATGGTAC
TACCTCCATTGCTCAGGAGCTATGGCAACTGGCTGGTATAAGGAAGGCTCAACTTGGTACTATCTAGATGCTGAAAA
TGGTGATATGAGAACTGGCTGGCAAAACCTTGGGAACAAATGGTACTATCTCCGTTTCATCAGGAGCTATGGCAACTG
GTTGGTATCAGGAAAGTTGCACTTGGTACTATCTAAATGCAAGTAATGGAGATATGAAAACAGGCTGGTTCCAAGTC
AATGGTAACCTGGTACTATGCCTATGATTGAGGTGCTTTAGCTGTAAATACCACAGTAGGTGGTTACTACTTAACTA
TAATGGTGAATGGGTTAAGTAA

MKLLKKMMQIALATFFFGLLATNTVFADDSEGWFQVQENGRYYKKGDLKETYYWRVIDGKYYYYFDPLSGEMVVGWQY
IPAPHKGVITIGSPRIEIALRPDWFYFGQDGVLEQEFVGKQVLEAKTATNTNKHGEEYDSQAEKRVYYFEDQRSYHT
LKTGWIYEEGHWWYLLQKDGGFDSRINRLTVGELARGWVKDYPLTYDEEKLKAAPWYYLNPATGIMQTGWQYLGNRWY
YLHSSGAMATGWYKEGSTWYYLDAENGDMRTGWQNLGNKWWYLRSSGAMATGWYQESSTWYYLNASNGDMKTGWQV
NGNWWYAYDSGALAVNTTVGGYLLNNGEWVKZ

ID306

TTGGCTGGTAGATATGGTTCTGCTGTTCACTGTACAGAAGTGAAGTGCCTCAAACCTTTCAACAGTTAAAACTAAAGC
TACGGTTGTAGAAAAACCACTGAAAGATTTTAGAGCGTCTACGTCTGATCAGTCTGGTTGGGTGGAATCTAATGGTA
AATGGTATTTCTATGAGTCTGGTGATGTGAAGACAGGTTGGGTGAAAAACAGATGGTAAATGGTACTATTTGAATGAC
TTAGGTGTCTGACAGACTGGATTGTAAAATTTCTGGTAGCTGGTATTACTTGAGCAATTCAAGGTCTATGTTTAC
AGGCTGGGGAACAGATGGTAGCAGATGGTTCTACTTTGACGGCTCAGGAGCTATGAAGACAGGCTGTACAAGGAAA
ATGGCACTTGGTATTACCTTGACGAAGCAGGTATCATGAAGACAGGTTGGTTTAAAGTCGGACCACACTGGTACTAT
GCCTACGGTTCAGGAGCTTTGGCTGTGAGCACAACAACACCAGATGGTTACCGTGTAAATGGTAATGGTGAATGGGT
AAACTAG

LAGRYGSAVQCTEVTASNLSVVKTKATVVEKPLKDFRSTSDQSGWVESNGKWYFYESGDVKTGWVKTDGKWWYLLND
LGVMQTGFVKFSGSWYYLSNSGAMFTGWGTDGSRWFYFDGSGAMKTGWYKENGWYLLDEAGIMKTGWFKVGPWWY
AYGSGALAVSTTTPDGYRVNNGEWVNZ

ID307

ATGAAAATTTTGAaaaaaaCTATGCAAGTTGGACTGACAGTATTTTCTTTGGTTTGCTAGGGACCAGTACAGTATT
TGCAGATGATTCTGAAGGATGGCAGTTTGTCCAAGAAAACCGAAGAACCTACTACAAAAAGGGGGACCTCAAAGAAA
CCTACTGGCGAGTGATTGATGGTAAGTACTATTATTTGATTCTCTATCTGGAGAGATGGTTGTGCGCTGGCAATAT
ATCCCCTTTCCATCTAAAGGTAGTACAATTGGTCTTACCCAAATGGTATCAGATTAGAAGGTTTTCAAAAGTCAGA
GTGGTACTACTTCGATAAAAAATGGAGTGCTACAAGAGTTTGTGGTTGGAAAACATTAGAGATTAAAACTAAAGACA
GTGTTGGAAGAAAGTACGGGGAAAAACGTGAAGATTGAGAAGATAAAGAAGAGAAGCGTTATTATACGAACTATTAC
TTAATCAAAATCATTCTTTAGAGACAGGTTGGCTTTATGATCAGTCTAACTGGTATTATCTAGCTAAGACGGAAAT
TAATGGAGAAAACCTTGGTGGTGAAAGACGTGCGGGTGGATAAACGATGATTGCACTTGGTACTACCTAGATC
CAACAACCTGGTATTATGCAAAACAGGTTGGCAATATCTAGGTAATAAGTGGTACTACCTCCGTTCCCTCAGGAGCAATG
GCCACTGGCTGGTATCAGGAAGGTACCCTTGGTATTATTTAGACCACCCAAATGGCGATATGAAAACAGGTTGGCA
AAACCTTGGGAACAAATGGTACTATCTCCGTTTCATCAGGAGCTATGGCAACTGGTTGGTATCAAGATGGTTCAACTT
GGTACTACCTAAATGCAGGTAATGGAGACATGAAGACAGGTTGGTTCCAGGTCAATGGCAACTGGTACTATGCTTAT
AGCTCAGGTGCTTTGGCAGTGAATACGACCGTAGATGGCTATTCTGTCAACTATAATGGCGAATGGGTTCCGGTAA

MKILKKTMQVGLTVFFFGLLTSTVFADDSEGWFQVQENGRYYKKGDLKETYYWRVIDGKYYYYFDSLSEGMVVGWQY
IPFPSKGSTIGPYPNGIRLEGFPKSEWYYFDKNGVLEQEFVGWKTLEIKTKDSVGRKYGEKREDSKKEEKRYTNY
FNQNHSLGTWLYDQSNWYYLAKTEINGENYLGGERRAGWINDSTWYYLDPTTGIMQTGWQYLGKWWYLRSSGAM
ATGWYQEGTTWYYLDHPNGDMKTGWQNLGNKWWYLRSSGAMATGWYQDGSTWYYLNAGNGDMKTGWQVNGNWWYAY
SSGALAVNTTVDGYSVNYNGEVRZ

ID308

ATGAAAAAGAAATTAAGTATTAGCACTTGTAGGCGCTTTTATAGGTTTGTCTAGGTATGGGAATGTTCAAGGCTCA
AGAAAGTTCAGGAAATAAAATCCACTTTATCAATGTTCAAGAAGGTGGCAGTGATGCGATTATCTTGAAAGCAATG
GACATTTTGCCATGGTGGATACAGGAGAAGATTATGATTTCCAGATGGAAGTGATCTCGCTATCCATGGAGAGAA
GGAATTGAAACGCTCTTATAAGCATGTTCTAACAGACCGTGTCTTTCGTCGTTTGAAGGAATTGGGTGTCCAAAACT
TGATTTTATTTTGGTGACCCATACCCACAGTGATCATATTGGAAATGTTGATGAATTACTGTCTACCTATCCAGTTG
ACCGAGTCTATCTTAAGAAATATAGTGATGCTGATTAATCTGAACGCTCTATGGGATAATCTGGTATGGCTAT
GATAAGGTTTTACAGACTGCTGCAGAAAAAGGTGTTTTCAGTTATTCAAAATATCACACAAGGGGATGCTCATTTC
GTTTGGGGACATGGATATTCAGCTCTATAATTATGAAAATGAACTGATTTCATCGGGTGAATTAAGAAAAATTTGGG

ATGACAATTCCAATTCCTTGATTAGCGTGGTGAAAGTCAATGGCAAGAAAATTTACCTTGGGGGCGATTAGATAAT
GTTTCATGGAGCAGAAGACAAGTATGGTCCTCTCATTGGAAAAAGTTGATTGATGAAGTTAATCATCACCATGATAC
CAACAAATCAAATACCAAGGATTTTCATTAAAAATTTGAGTCCGAGTTTGATTGTTCAAACCTCGGATAGTCTACCTT
5 GGA AAAATGGTGTGATAGTGAGTATGTTAATTGGCTCAAAGAACGAGGAATTGAGAGAATCAACGCAGCCAGCAAA
GACTATGATGCAACAGTTTTTGGATATTCGAAAAGACGGTTTTTGTCAATATTTCAACATCCTACAAGCCGATTCCAAG
TTTTCAAGCTGGTTGGCATAAGAGTGCATATGGGAAGTGGTGGTATCAAGCGCCTGATTCTACAGGAGAGTATGCTG
TCGGTTTGGAAATGAAATCGAAGGTGAATGGTATTACTTTAACCAAACGGGTATCTTGTTACAGAATCAATGGAAAAAA
TGGAAACAATCATTGGTTCTATTTGACAGACTCTGGTGCTTCTGCTAAAAATTTGGAAGAAAATCGCTGGAATCTGGTA
TTATTTTAAACAAAGAAAACCAGATGGAAATTTGGTTGGATTCAAGATAAAGAGCAGTGGTATTATTGGATGTTGATG
10 GTTCTATGAAGACAGGATGGCTTCAATATATGGGGCAATGGTATTACTTTGCTCCATCAGGGGAAATGAAAATGGGC
TGGGTAAAAGATAAAGAAACCTGGTACTATATGGATTCTACTGGTGTCTGAAGACAGGTGAGATAGAAGTTGCTGG
TCAACATTATTATCTGGAAGATTTCAGGAGCTATGAAGCAAGGCTGGCATAAAAAGGCAAATGATTGGTATTTCTACA
AGACAGACGGTTACGAGCTGTGGTTGGATCAAGGACAAGGATAAATGGTACTTCTTGAAGAAAATGGTCAATTA
CTTGTGAACCGTAAGACACCAGAAGGTTATACTGTGGATTCAAGTGGTGCCTGGTTAGTGGATGTTTCGATCGAGAA
15 ATCTGCTACAATTA AAACTACAAGTCATT CAGAAATAAAGAATCCAAAGAAGTAGTGAAAAAGGATCTTGAAAAATA
AAGAACGAGTCAACATGAAAGTGTTACAAATTTTCAACTAGTCAAGATTGACATCCTCAACTTCACAAAGCTCT
GAAACGAGTGTAACAAATCGGAATCAGAACAGTAG

MKKKLTSLALVGAFGLGSWYGNVQAQESSGNKIHFINVQEGGSDAI ILESNGHFAMVDTGEDYDFPDGSDSRYPWRE
GIETSYKHLVTDVRFRRLKELGVQKLDLILVTHSDHIGNVDELLSTYPVDRVYLKKYSDSRI TNSERLWDNLGY
20 DKVLQTAEEKGVSVIQNITQGDHFQFGDMDIQLNYENETDSSGELKKIWDNNSNLSI SVVKVNGKKIYLGGLDN
VHGAEDKYGPLIGKVDLMKFNHHHDTNKSNTKDFIKNLSPLIVQTSDSL PWKNGVDSEYVNW LKERGIERINAASK
DYDATVFDIRKDFVNISTSYKPIPSFQAGWHKSAYGNWYQAPDSTGEYAVGWNEIEGEWYYFNQTGILLQONQWK
WNNHWFYLTDSGASAKNWKKIAGIWIYFNKENQMEIGWIQDKEQWYYLDVDGSMKTGWLQYMGQWYYFAPSGEMKMG
25 WVKDKETWYMDSTGVMKTGEIEVAGQHYYLED SGAMKQGW HKKANDWYFYKTDGSRVAGWIKDKDKWYFLKENGQL
LVNGKTPEGYTVDSSGAWLVDVSI EKSATIKTTSHEIKESKEVVKKDL ENKETSQHESVTNFSTSQDLTSSTSQSS
ETSVNKSESEQZ

ID309

ATGGAAATTAATGTGAGTAAATTAAGAACAGATTTGCCTCAAGTCGGCGTGCAACCATATAGGCAAGTACACGCACA
CTCAACTGGGAATCCGCATTCAACCGTACAGAATGAAGCGGATTATCACTGGCGGAAAGACCCAGAATTAGGTTTTT
TCTCGCACATTGTTGGGAACGGTTGCATCATGCAGGTAGGACCTGTTGATAATGGTGCCTGGGACGTTGGGGGCGGT
TGGAAATGCTGAGACCTATGCAGCGGTTGAACTGATTGAAAGCCATTCAACCAAAGAAGAGTTTCATGACGGACTACCG
30 CCTTTATATCGAACTCTTACGCAATCTAGCAGATGAAGCAGGTTTGCCGAAACGCTTGATACAGGAGTTTATGCTG
GAATTA AAACGCACGAGTATTGCACGAATAACCAACCAACCAACCACTCAGACCAGTTGACCCTTATCCATCTCTT
GCTAAATGGGGCATTAGCCGTGAGCAGTTTAAAGCATGATATTGAGAACGGCTTGACGATTGAAACAGGCTGGCAGAA
GAATGACACTGGCTACTGGTACGTACATT CAGACGGCTCTTATCCAAAAGACAAAGTTTGAGAAAATCAATGGCACTT
GGTACTACTTTGACAGTT CAGGCTATATGCTTG CAGACCGCTGGAGGAAGCACACAGACGGCAACTGGTACTGGTTC
35 GACAACTCAGGCGAAATGGCTACAGGCTGGAAAGAAAATCGCTGATAAGTGGTACTATTTCAACGAAGAAGGTGCCAT
GAAGACAGGCTGGGTCAAGTACAAGGACACTTGGTACTACTTAGACGCTAAAGAAGGCGCCATGGTATCAAATGCCT
TTATCCAGTCAGCGGACGGAACAGGCTGGTACTACCTCAAACCAGACGGAACACTGGCAGACAAGCCAGAATTCACA
GTAGAGCCAGATGGCTTGATTACAGTAAATAA

MEINVS KLRTDLPQVGVPYRQVHAHSTGNPHSTVQNEADYHWRKDP ELGFFSHIVGNGC IMQVGPVDNGAWDVG GG
45 WNAETYAAVELIESHSTKEEFMTDYRLYIELLRNLADEAGLPKLTDTGSLAGIKTHEYCTNNQPNHSDHVPYPYL
AKWGISREQFKHDIENGLTIE TGWQKNDTGWYVHSDGSYPKDKFEKINGTWYFDSSGYMLADRWRKHTDGNWYWF
DNSGEMATGWKKIADKWYFNEEGAMKTGWVKYKDTWYLLDAKEGAMVSNAFIQSADGTGWYLLKPDGTLADKPEFT
VEPDGLITVKZ

ID310

ATGGGCACAACAGGATTTACAATAATTGACTTAATTATCTTGATTGTTTATTTACTTGCGGTGTTGGTTGCAGGTAT
CTATTTCTCTAAAAAAGAGATGAAAGGAAAAGAGTCTTTAAAGGAGATGGTTCCGTTTCCTTGGTATGTTACTTCGG
TATCCATTTTTTGCCACAATGCTCAGTCCGATTTCCTTCTTGGGACTCGCTGGTAGCTCTTATGCAGGTAGCTGGATT
TTATGGTTTGCTCAATTAGGGATGGTAGTAGCTATTCCACTGACAATTCGTTTTATCTTACCTATCTTTGCACGGAT
50 AGACATCGATACGGCATATGATTACTTGGATAAACGTTTTAATTCTAAAGCACTTCGTATTATTTCAGCACTCTTGT
TTATTATTTATCAATTGGGACGTATGTCTATCATTATGTACCTCCCATCAGCTGGTTTTATCAGTATTGACAGGAATT
GACATCAATATTTTGATTATTTTGATGGGTGTAGTTGCAATTGTTTTATTCTTATACTGGTGGTCTAAAATCCGTATT
ATGGACAGACTTTATTCAAGGTGTGATTCTGATTAGTGGTGTGCTTTTAGCTTTATTTGTACTGATTGCTAATATTA
AAGGTGGCTTTGGTGCAGTAGCAGAAACATTAGCAAACGGGAAATTCCTTGCTGCAATGAAAACTTTTCGATCCT
60 AACTTGCTTTCAAACCTCCATCTTTTAAATTGTGATGGGTT CAGGCTTTACAATCTTGTCTTCTATGCTTCATCTCA

AGATTTGGTTCAACGTTTTACTACAACACAAAATATTAAGAACTTAATAAGATGTTGTTACAAAACGGTGTGTTTGT
 CACTTGCAACTGCAACAGTCTTTTACTTGATTGGTACAGGCTTGTACGTATTCTATCAAGTACAAAATGCAGATAGT
 GCAGCTAGCAATATCCCTCAAGACCAAATCTTTATGTACTTTATTGCATACCAGTTACCAGTAGGTATCACAGGTTT
 5 GATCTTGGCAGCGATTTATGCAGCATCTCAATCAACTATTTCAACAGGTTTGAACCTGTTGCAACTTCATGGACAT
 TGGATATTTCAAGATGTCATTTCTAAAAATATGTCAGACAATCGTCGTACGAAAATTCGACAATTCGTATCTCTAGCA
 GTAGGTTTATTCTCAATTGGTGTTCATTGTCTATGGCTCACTCAGATATTAAATCTGCATACGAATGGTTCAATAG
 TTTTCATGGGACTGTACTTGGTCTACTTGGTGGTGTATTTATTCTTGGATTTGTTTCTAAAAAAGCAAATAACAAG
 GTGCTTATGCAGCGCTGATTGTATCAACCATCGTCATGGTATTTATTAAATACTTCTTCTCCAACAGCTGTTAGC
 10 TACTGGGCATATTCAATTGATTTCAATCTCTGTATCAGTAGTTTCAGGTTATATTGTATCTGTTCTTACTGGAAATAA
 AGTATCTGCACCTAAATATACAACGATTCATGATATTACAGAAATTAAAGCGGATTCAAGTTGGGAAGTTCGTCACT
 AA

MGTGFTIIDLIILIVYLLAVLVAGIYFSKKEMKGKEFFKGDGSPWYVTSVSI FATMLSPI SFLGLAGSSYAGSWI
 LWFAQLGMVVAIPLTIRFILPI FARIDIDTAYDYLDKRFNSKALRIISALLFI IYQLGRMSIIMYLP SAGLSVLTGI
 15 DINILIILMGVVAIVYSYTGGLKSVLWTDFIQGVILISGVVLLFVLIANIKGGFGAVAETLANGKFLAANEKLFDP
 NLLSNSIFLIVMGSGFTILSSYASSQDLVQRFRTTQNIKKLNKMLFTNGVLSLATATVFYLI GTGLYVFYQVQNADS
 AASNIPQDQIFMYFIAYQLPVGITGLILAAIYAASQSTISTGLNSVATSWTLDIQDVISKNMSDNRRTKIAQFVSLA
 VGLFSIGVSIVMAHSDIKSAYEFNSFMGLVLGLLGGVFILGFVSKKANKQGAYAALIVSTIVMVFIKYFLPPTAVS
 20 YWAYSLSISISVSVSGYIVSVLTGNKVSAPKYTTIHDITEIKADSSWEVRHZ

ID311

ATGAAAATTAATAAAAAATATCTAGCAGGTT CAGTGGCAGTCCCTTGCCCTAAGTGTGTTGTTCTATGAGCTTGGTGC
 TCACCAAGCTGGTCAGGATAAGAAAGAGTCTAATCGAGTTGCTTATATAGATGGTGATCAGGCTGGTCAAAAGGCAG
 25 AAAACTTGACACCAGATGAAGTCAGTAAGAGGGAGGGGATCAACGCCGAACAAATCGTCATCAAGATTACGGATCAA
 GGTATGTGACCTCTCATGGAGACCATTATCATTACTATAATGGCAAGGTCCCTTATGATGCCATCATCAGTGAAGA
 GCTCCTCATGAAAGATCCGAATTATCAGTTGAAGGATT CAGACATTGTCAATGAAATCAAGGGTGGTTATGTCTATCA
 AGGTAGACGGAAAATACTATGTTTACCTTAAGGATGCAGCTCATGCGGATAATATTCGGACAAAAGAGAGATTAAA
 CGTCAGAAGCAGGAACGCAGTCATAATCACGGGT CAGGAGCTAACGATCATGCAGTAGCTGCAGCCAGAGCCCAAGG
 ACGCTATACAACGGATGATGGGTATATCTTCAATGCATCTGATATCATTGAGGACACGGGTGATGCTTATATCGTTC
 30 CTCACGGCGACCATTACCATTACATTCCTAAGAATGAGTTATCAGCTAGCGAGTTAGCTGCTGCAGAAGCCCTATTGG
 AATGGGAAGCAGGGATCTCGTCTCTTCAAGTTCTAGTTATAATGCAAATCCAGCTCAACCAAGATTGT CAGAGAA
 CCACAATCTGACTGTCACTCCAACCTATCATCAAAATCAAGGGGAAAACATTTCAAGCCTTTTACGTGAATTGTATG
 CTAACCCCTTATCAGAACGCCATGTGGAATCTGATGGCCTTATTTTCGACCCAGCGCAAATCACAAGTCGAACCGCC
 AGAGGTGTAGCTGTCCCTCATGGTAACCATTACCACTTTATCCCTTATGAACAAATGTCTGAATTTGGAAGAACGAAT
 35 TGCTCGTATTATTCCTCTTCTGTTATCGTTCAACCATTTGGGTACCAGATTCAAGACCAGAACAACCAAGTCCACAAT
 CGACTCCGGAACCTAGTCCAAGTCCGCAACCTGCACCAAATCCTCAACCAGCTCCAAGCAATCCAATTGATGAGAAA
 TTGCTCAAAGAAGCTGTTTCGAAAAGTAGGCGATGGTTATGTCTTTGAGGAGAATGGAGTTTCTCGTTATATCCCAGC
 CAAGGATCTTT CAGCAGAAACAGCAGCAGGCATTGATAGCAAACCTGGCCAAGCAGGAAAAGTTTATCTCATAAGCTAG
 40 GAGCTAAGAAAAGTACCTCCCATCTAGTGATCGAGAATTTTACAATAAGGCTTATGACTTACTAGCAAGAATTCAC
 CAAGATTTACTTGATAATAAAGGTGACAAAGTTGATTTT GAGGCTTTGGATAACCTGTTGGAACGACTCAAGGATGT
 CCCAAGTGATAAAGTCAAGTTAGTGGATGATATTCTTGCCTTCTTAGCTCCGATTCTGTCATCCAGAACGTTTAGGAA
 AACCAAATGCGCAAATTACCTACACTGATGATGAGATTCAAGTAGCCAAGTTGGCAGGCAAGTACACAACAGAAGAC
 GGTATATCTTTGATCCTCGTGATATAACCAGTGATGAGGGGGATGCCATGTAACTCCACATATGACCCATAGCCA
 45 CTGGATTAAAAAAGATAGTTTGTCTGAAGCTGAGAGAGCGGCAGCCAGGCTTATGCTAAAGAGAAAAGGTTTGACCC
 CTCCTTCGACAGACCATCAGGATTCAGGAAATACTGAGGCAAAAGGAGCAGAAGCTATCTACAACCGCGTGAAAGCA
 GCTAAGAAGGTGCCACTTGATCGTATGCCTTACAATCTTCAATATACTGTAGAAGTCAAAAACGGTAGTTAATCAT
 ACCTCATTATGACCATTACCATAACATCAAATTTGAGTGGTTTGACGAAGGCCTTTATGAGGCACCTAAGGGGTATA
 CTCTTGAGGATCTTTTGGCGACTGTCAAGTACTATGTGCAACATCCAAACGAACGTCGCGATT CAGATAATGGTTTT
 50 GGTAAACGCTAGCGACCATGTTCAAAGAAACAAAAATGGTCAAGCTGATACCAATCAAACGGAAAAACCAAGCGAGGA
 GAAACCTCAGACAGAAAAACCTGAGGAAGAAACCCCTCGAGAAGAGAAACCGCAAAGCGAGAAACAGAGTCTCCAA
 AACCAACAGAGGAACCAAGAATCACCAGAGGAATCAGAAGAACCTCAGGTCGAGACTGAAAAGGTTGAAGAAAAA
 CTGAGAGAGGCTGAAGATTTACTTGGAAAAATCCAGGATCCAATTATCAAGTCCAATGCCAAAGAGACTCTCACAGG
 ATTAATAATAATTTACTATTTGGCACCCAGGACACAATACTATTATGGCAGAAGCTGAAAAAATATTGGCTTTTAT
 55 TAAAGGAGAGTAAGTAA

MKINKKYLAVSVCSYELGRHQAGQDKKESNRVAYIDGDQAGQKAENLTPDEVSKREGINAEQIVIKITDQ
 GYVTSBGDHYHYNGKVPYDAII SEELLMKDPNYQLKDS DIVNEIKGGYVIKVDGKYVYVLKDAHADNIRTKKEIK
 60 RQKQERSHNHGSGANDHAVAARAARGRYTDDGYIFNASDI IEDTGDAYIVPHGDHYHYIPKNELSAELAAAEAYW
 NGKQGRSPSSSSSYNANPAQPRLSNHNLTVTPTYHQNGENISSLLRELYAKPLSERHVESDGLIFDPAQITSRTA
 RGVAVPHGNHYHFIPYEQMSELEKRIARI IPLRYRSNHWVPDSRPEQSPQSTPEPSPQBPAPNPQAPSNPIDEK

5 LVKEAVRKVG DGYVFEENGVSRYIPAKDLSAETAAGIDSKLAKQESLSHKLGAKKTDLPSSDREFYNKAYDLLARIH
QDLLDNKGRQVDFEALDNLLERLKDVP SDKVKLVDDILAF LAPIRH PERLGKPN AQITYTDDEIQVAKLAGKYTTED
GYIFDPRDITSDEGDAYVTPHMTSHWIKKDSLSEAERAAAQAYAKEKGLTPPSTDH QDSGNTEAKGAEAIYNRVKA
AKKVPLDRMPYNLQYTV EVKNGSLIIPHYDHYHNIKFEWFDEGLYEAPKGYTLEDLLATVKYVVEHPNERPHSDNGF
GNASDHVQRNKNQGADTNQTEKPSEKPKQTEKPEEETPREKPKQSEKPESPKPT EEPEESPEESEEPQVETEKVEEK
LREAEDLLGKIQDP I I K S N A K E T L T G L K N N L L F G T Q D N N T I M A E A E K L L A L L K E S K Z

ID312

10 ATGGAGGGATTGGTTAGAGTGCATTTATTGCCTGTATTTGGCGATTACAAGCTATCTAAACTTACTACGCCTATTCT
TCAACAGCAAGTAAACAAATGGGCTGACAAGGCAAATAAAGGCGAAAAAGGGGCATTTGCTAACTACTCTTTGCTCC
ATAACATGAATAAGCGTATTTTGAATATGGCGTAGCTATCCAGGTAATACAATACAACCCAGCTAATGATGTCATC
15 GTTCCACGCAAAACAGCAAAAAGAAAAGGCTGCTGTCAAATACTTAGACAACAAAGAATTAAACAGTTTCTTGATTA
TTTAGATGCTCTGGATCAATCAAATTATGAGAACTTATTTGATGTTGTTCTGTATAAGACTTTATTGGCCACTGGTT
GCCGTATTAGTGAGGCTCTGGCTCTTGAATGGTCTGATATTGACCTAGAAAGCGGTGTTATCAGCATCAATAAGACA
CTAAACCGCTATCAGGAAATAAACTCACCTAAATCAAGCGCTGGTTATCGTGATATACCAATAGACAAAGCCACATT
ACTTTTACTGAAACAATACAAAACCGTCAACAAATTCAGTCTTGGAATTAGGCCGATCTGAAACAGTTGTATTCT
CTGTATTTACGGAGAAATATGCTTATGCTTGTAACCTACGCAAACGCCTAAATAAGCATTGTTGATGCTGCTGGAGTA
ACTAACGTATCATTTTCATGGTTTCGCCATACATACTACTATGATGCTCTATGCTCAGGTTAGCCCGAAAGATGT
20 TCAGTATAGATTAGGCCACTCTAATTTAATGATCACTGAAAATACTTACTGGCATACTAACCAGAGAATGCAAAAA
AAGCCGTCTCAAATTATGAAACAGCTATCAACAATTTATAA

MEGLVRVHLLPVFGDYKLSKLTTPILQQQVNKWADKANKGEKGFANYSL LHMNMKRILKYGVAIQVIQYNPANDVI
VPRKQQKEKA AVKYLDNKELKQFLDYLDALDQSNYENLFDVVLYKTL LATGCR ISEALALEWSDIDLESGVISINKT
25 LNRYQEINSPKSSAGYRDIPIDKATLLLLLKQYKNRQIQSWKLRSETVVF SVFTEKYAYACNLKR LNKHFDAAGV
TNVSFHGFRHTHTMMLYAQVSPKDVQYRLGHSNLMITENTYWHNTQENAKKAVSNYETAINNLZ

CLAIMS:

1. A *Streptococcus pneumoniae* protein or polypeptide having a sequence selected from those shown in table 2.

5

2. A *Streptococcus pneumoniae* protein or polypeptide having a sequence selected from those shown in table 4.

10

3. A protein or polypeptide as claimed in claim 1 or claim 2 provided in substantially pure form.

4. A protein or polypeptide which is substantially identical to one defined in any one of claims 1 to 3.

15

5. A homologue or derivative of a protein or polypeptide as defined in any one of claims 1 to 4.

20

6. An antigenic and/or immunogenic fragment of a protein or polypeptide as defined in Tables 2-4.

7. A nucleic acid molecule comprising or consisting of a sequence which is:

25

(i) any of the DNA sequences set out in Table 1 or their RNA equivalents;

(ii) a sequence which is complementary to any of the sequences of (i);

(iii) a sequence which codes for the same protein or polypeptide, as those sequences of (i) or (ii);

- (iv) a sequence which is substantially identical with any of those of (i), (ii) and (iii);
- 5 (v) a sequence which codes for a homologue, derivative or fragment of a protein as defined in Table 1.
8. A nucleic acid molecule comprising or consisting of a sequence which is:
- 10 (i) any of the DNA sequences set out in Table 4 or their RNA equivalents;
- (ii) a sequence which is complementary to any of the sequences of (i);
- 15 (iii) a sequence which codes for the same protein or polypeptide, as those sequences of (i) or (ii);
- (iv) a sequence which is substantially identical with any of those of (i), (ii) and (iii);
- 20 (v) a sequence which codes for a homologue, derivative or fragment of a protein as defined in Table 4.
9. The use of a protein or polypeptide having a sequence selected from those shown in Tables 2-4, or homologues, derivatives and/or fragments thereof, as an
- 25 immunogen and/or antigen.
10. An immunogenic and/or antigenic composition comprising one or more proteins or polypeptides selected from those whose sequences are shown in Tables 2-

4, or homologues or derivatives thereof, and/or fragments of any of these.

11. An immunogenic and/or antigenic composition as claimed in claim 10 which is a vaccine or is for use in a diagnostic assay.

5

12. A vaccine as claimed in claim 11 which comprises one or more additional components selected from excipients, diluents, adjuvants or the like.

10

13. A vaccine composition comprising one or more nucleic acid sequences as defined in Tables 1, 3 or 4.

15

14. A method for the detection/diagnosis of *S.pneumoniae* which comprises the step of bringing into contact a sample to be tested with at least one protein or polypeptide as defined in Tables 2-4, or homologue, derivative or fragment thereof.

15. An antibody capable of binding to a protein or polypeptide as defined in Tables 2-4, or for a homologue, derivative or fragment thereof.

20

16. An antibody as defined in claim 15 which is a monoclonal antibody.

17. A method for the detection/diagnosis of *S.pneumoniae* which comprises the step of bringing into contact a sample to be tested and at least one antibody as defined in claim 15 or claim 16.

25

18. A method for the detection/diagnosis of *S.pneumoniae* which comprises the step of bringing into contact a sample to be tested with at least one nucleic acid sequence as defined in claim 7 or claim 8.

19. A method of determining whether a protein or polypeptide as defined in Tables 2-4 represents a potential anti-microbial target which comprises inactivating said protein or polypeptide and determining whether *S.pneumoniae* is still viable *in vitro* or *in vivo*.

5

20. The use of an agent capable of antagonising, inhibiting or otherwise interfering with the function or expression of a protein or polypeptide as defined in Tables 2-4 in the manufacture of a medicament for use in the treatment or prophylaxis of *S.pneumoniae* infection

1 / 2

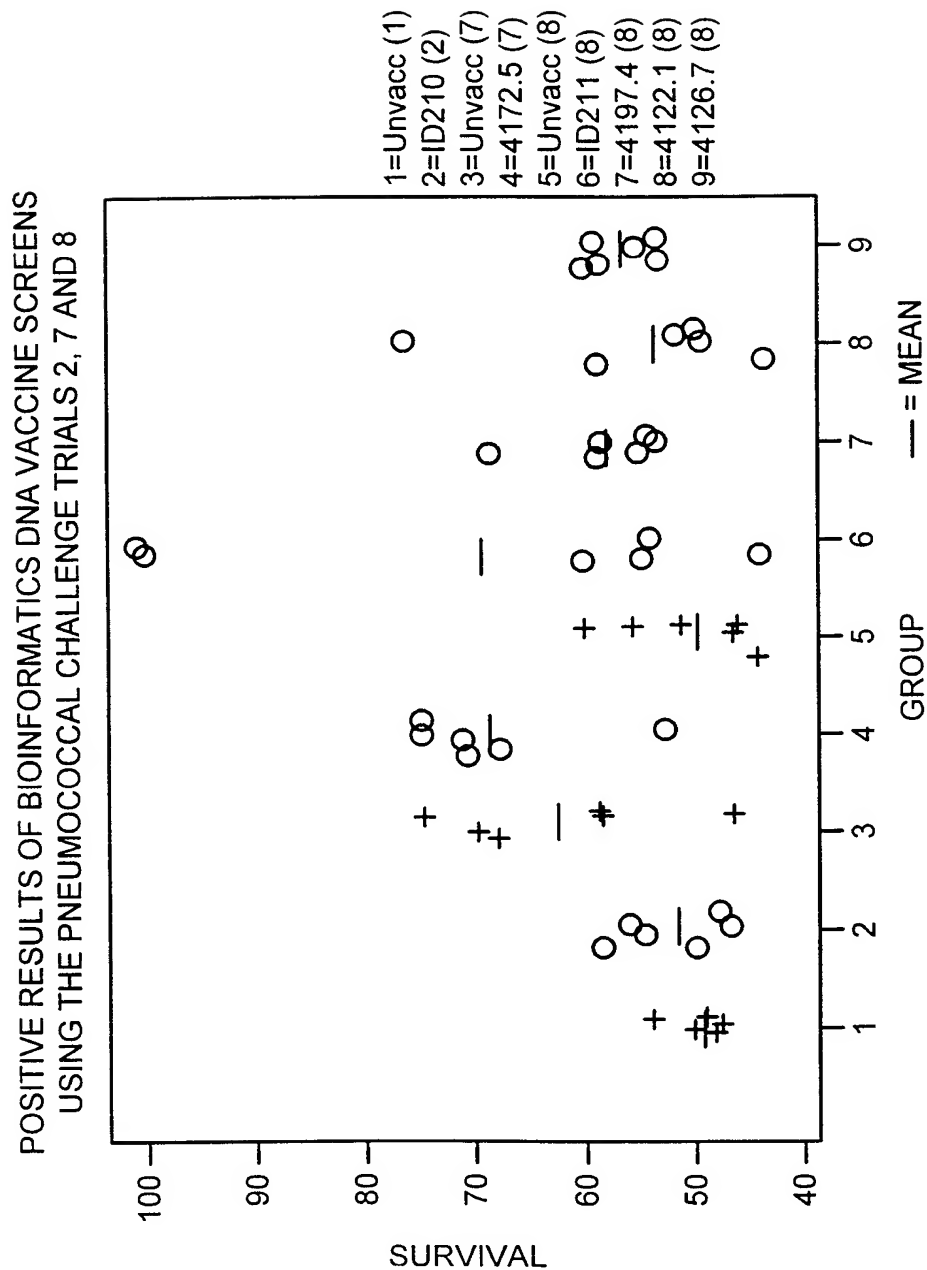


FIG. 1

2 / 2

POSITIVE RESULTS OF BIOINFORMATICS DNA VACCINE SCREENS
USING THE PNEUMOCOCCAL CHALLENGE TRIALS 9 - 11

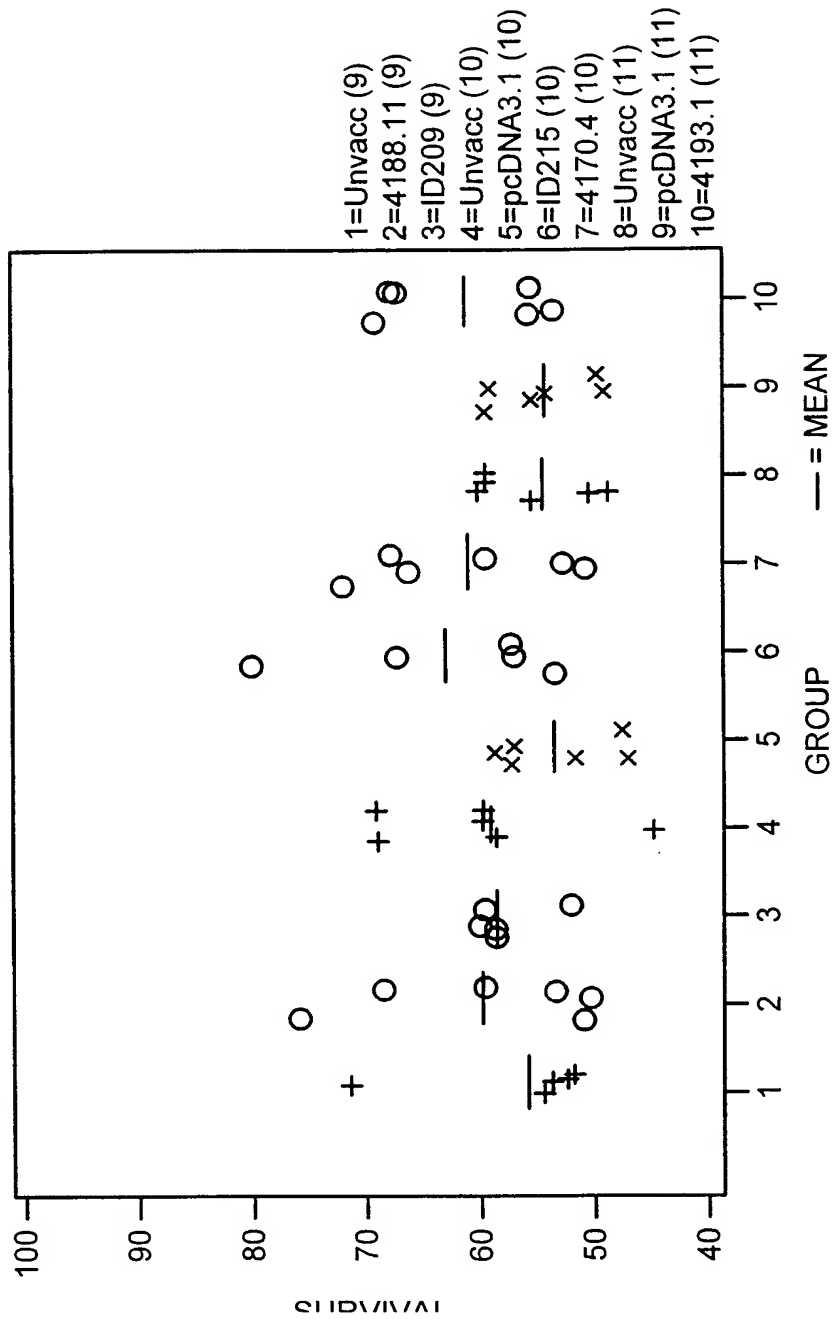


FIG. 2



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|--|-----------|---|
| (51) International Patent Classification ⁷ : C12N 15/31, C07K 14/315, 16/12, G01N 33/50, A61K 39/09, C12Q 1/68 | A3 | (11) International Publication Number: WO 00/06737 (43) International Publication Date: 10 February 2000 (10.02.00) |
| (21) International Application Number: PCT/GB99/02451 (22) International Filing Date: 27 July 1999 (27.07.99) (30) Priority Data: 9816337.1 27 July 1998 (27.07.98) GB 60/125,164 19 March 1999 (19.03.99) US (71) Applicant (for all designated States except US): MICROBIAL TECHNICS LIMITED [GB/GB]; 20 Trumpington Street, Cambridge CB2 1QA (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): GILBERT, Christophe, François, Guy [FR/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB1 1PQ (GB). HANSBRO, Philip, Michael [GB/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB2 1QP (GB). (74) Agents: CHAPMAN, Paul, William et al.; Kilburn & Strode, 20 Red Lion Street, London WC1R 4PJ (GB). | | (81) Designated States: CN, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims</i> <i>and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 29 June 2000 (29.06.00) |
| (54) Title: STREPTOCOCCUS PNEUMONIAE PROTEINS AND NUCLEIC ACID MOLECULES (57) Abstract Novel protein antigens from <i>Streptococcus pneumoniae</i> are disclosed, together with nucleic acid sequences encoding them. Their use in vaccines and in screening methods is also described. | | |

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|----|--------------------------|----|--|----|--|----|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | ML | Mali | TR | Turkey |
| BG | Bulgaria | HU | Hungary | MN | Mongolia | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MR | Mauritania | UA | Ukraine |
| BR | Brazil | IL | Israel | MW | Malawi | UG | Uganda |
| BY | Belarus | IS | Iceland | MX | Mexico | US | United States of America |
| CA | Canada | IT | Italy | NE | Niger | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NL | Netherlands | VN | Viet Nam |
| CG | Congo | KE | Kenya | NO | Norway | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NZ | New Zealand | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | PL | Poland | | |
| CM | Cameroon | KR | Republic of Korea | PT | Portugal | | |
| CN | China | KZ | Kazakhstan | RO | Romania | | |
| CU | Cuba | LC | Saint Lucia | RU | Russian Federation | | |
| CZ | Czech Republic | LI | Liechtenstein | SD | Sudan | | |
| DE | Germany | LK | Sri Lanka | SE | Sweden | | |
| DK | Denmark | LR | Liberia | SG | Singapore | | |
| EE | Estonia | | | | | | |

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02451

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/31 C07K14/315 C07K16/12 G01N33/50 A61K39/09
C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K G01N A61K C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | WO 98 18931 A (DOUGHERTY BRIAN A ;HUMAN GENOME SCIENCES INC (US); ROSEN CRAIG A () 7 May 1998 (1998-05-07) SEQ ID NO 3,5,21,69,127,139,187 --- | 1,3-7, 9-19 |
| T | LANGE ROLAND ET AL: "Domain organization and molecular characterization of 13 two-component systems identified by genome sequencing of Streptococcus pneumoniae." GENE (AMSTERDAM) SEPT. 3, 1999, vol. 237, no. 1, pages 223-234, XP004183515 ISSN: 0378-1119 page 229; figures 1,3 --- -/-- | 1,3-7 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

27 April 2000

Date of mailing of the international search report

09. 05. 2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Espen, J

INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/GB 99/02451

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | GUENZI ERIC ET AL: "A two-component signal-transducing system is involved in competence and penicillin susceptibility in laboratory mutants of Streptococcus pneumoniae." MOLECULAR MICROBIOLOGY 1994, vol. 12, no. 3, 1994, pages 505-515, XP000905352 ISSN: 0950-382X --- | |
| P,X | EP 0 885 966 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 23 December 1998 (1998-12-23) SEQ ID NO 1,2,3 --- | 1,3-7, 9-19 |
| P,X | EP 0 891 984 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 20 January 1999 (1999-01-20) SEQ ID No 1,3,4 --- | 1,3-7, 9-19 |
| X | WO 98 18930 A (HUMAN GENOME SCIENCES INC ;CHOI GIL H (US); HROMOCKYJ ALEX (US); J) 7 May 1998 (1998-05-07) SEQ ID NO 7,8,113,114,133,134,163,164,169,170 --- | 1,3-7, 9-19 |
| P,X | FONTAN PA ET AL: "Streptococcus pneumoniae choline transporter" EMBL DATABASE ENTRY AF162656, ACCESSION NUMBER AF162656,26 July 1999 (1999-07-26), XP002136498 nucleotide sequence and deduced amino acid sequence --- | 1,3-7 |
| X | FONTAN P A ET AL: "A choline transporter as a virulence determinant of Streptococcus pneumoniae." 97TH GENERAL MEETING OF THE AMERICAN SOCIETY FOR MICROBIOLOGY;MIAMI BEACH, FLORIDA, USA; MAY 4-8, 1997, vol. 97, 1997, page 103 XP000892162 Abstracts of the General Meeting of the American Society for Microbiology 1997 ISSN: 1060-2011 abstract --- | 1,3-7 |
| Y | TAKEMOTO K ET AL: "Putative ferric transport ATP-binding protein AFUC" SWISSPROT DATABASE ENTRY AFUC_ECOLI, ACCESSION NUMBER P37009, 1 June 1994 (1994-06-01), XP002136499 sequence --- -/-- | 6,9 |

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02451

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| Y | FLEISCHMANN RD ET AL: "Putative ferric transport ATP-binding protein AFUC" SWISSPROT DATABASE ENTRY AFUC_HAEIN, ACCESSION NUMBER P44531, 1 November 1995 (1995-11-01), XP002136500 sequence | 6,9 |
| Y | --- BLATTNER FR ET AL: "Spermidine/putrescine transport ATP-binding protein POTA" SWISSPROT DATABASE ENTRY POTA_ECOLI, ACCESSION NUMBER P23858, 1 November 1991 (1991-11-01), XP002136501 sequence | 6,9 |
| P,A | --- POLISSI ALESSANDRA ET AL: "Large-scale identification of virulence genes from Streptococcus pneumoniae." INFECTION AND IMMUNITY DEC., 1998, vol. 66, no. 12, December 1998 (1998-12), pages 5620-5629, XP002136502 ISSN: 0019-9567 | |
| A | --- DINTILHAC A ET AL: "The adc locus, which affects competence for genetic transformation in Streptococcus pneumoniae, encodes an ABC transporter with a putative lipoprotein homologous to a family of streptococcal adhesins." RESEARCH IN MICROBIOLOGY 1997, vol. 148, no. 2, 1997, pages 119-131, XP002115703 ISSN: 0923-2508 | |
| A | --- WO 95 06732 A (MASURE H ROBERT ;TUOMANEN ELAINE (US); PEARCE BARBARA J (US); UNIV) 9 March 1995 (1995-03-09) | |
| A | --- EP 0 622 081 A (UAB RESEARCH FOUNDATION) 2 November 1994 (1994-11-02) ----- | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 99/02451

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 20
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1,3-7,9-19 (SEQ ID NO: 1,208; 27,235; 80,292; 132,344; 137,349; 162,178; 166,182)
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 20

Claim 20 relates to the use of an agent capable of antagonising, inhibiting or otherwise interfering with the function or expression of a protein or polypeptide as defined in Tables 2-4 in the manufacture of a medicament. Neither a true technical characterization is given for such an agent, nor is such an agent defined in the application. In consequence, the scope of said claim is ambiguous and vague, and its subject-matter is not sufficiently disclosed and supported (Art. 5 and 6 PCT).

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the result to be achieved.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: in part: 1,3-7,9-19; all as far as applicable

Streptococcus (S.) pneumoniae protein or polypeptide having a sequence relating to SEQ ID No 1, antigenic and/or immunogenic fragment thereof; nucleic acid molecule relating to SEQ ID No 208, and vaccine comprising said nucleic acid; use of said protein or polypeptide as an immunogen and/or antigen; immunogenic and/or antigenic composition comprising said protein or polypeptide, and its use as a vaccine; antibody directed to said protein or polypeptide; method for the detection/diagnosis using either said protein/polypeptide, or said antibody, or said nucleic acid molecule; method of determining whether said protein or polypeptide represents a potential anti-microbial target

2-179. Claims: in part: 1-19; all as far as applicable

as invention 1 but limited to subject-matter relating SEQ ID Nos 2-151 (table 2), SEQ ID Nos 152-167 (table 3), and SEQ ID Nos 184-195 (table 4) and the corresponding nucleic acid molecules; wherein
invention 2 is limited to SEQ ID No 2,
invention 3 is limited to SEQ ID No 3, etc...
invention 179 is limited to SEQ ID No 195.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02451

| Patent document cited in search report | | Publication date | Patent family member(s) | | Publication date |
|---|---|---------------------|----------------------------|---|---------------------|
| WO 9818931 | A | 07-05-1998 | AU 5194598 | A | 22-05-1998 |
| | | | AU 6909098 | A | 22-05-1998 |
| | | | EP 0942983 | A | 22-09-1999 |
| | | | EP 0941335 | A | 15-09-1999 |
| | | | WO 9818930 | A | 07-05-1998 |
| ----- | | | | | |
| EP 0885966 | A | 23-12-1998 | CA 2235435 | A | 20-12-1998 |
| | | | JP 11103873 | A | 20-04-1999 |
| ----- | | | | | |
| EP 0891984 | A | 20-01-1999 | CA 2235441 | A | 20-12-1998 |
| | | | JP 11225772 | A | 24-08-1999 |
| ----- | | | | | |
| WO 9818930 | A | 07-05-1998 | AU 5194598 | A | 22-05-1998 |
| | | | AU 6909098 | A | 22-05-1998 |
| | | | EP 0942983 | A | 22-09-1999 |
| | | | EP 0941335 | A | 15-09-1999 |
| | | | WO 9818931 | A | 07-05-1998 |
| ----- | | | | | |
| WO 9506732 | A | 09-03-1995 | US 5928900 | A | 27-07-1999 |
| | | | AU 709405 | B | 26-08-1999 |
| | | | AU 7680994 | A | 22-03-1995 |
| | | | CA 2170726 | A | 09-03-1995 |
| | | | EP 0721506 | A | 17-07-1996 |
| | | | FI 960977 | A | 30-04-1996 |
| | | | JP 9504686 | T | 13-05-1997 |
| | | | NO 960839 | A | 19-04-1996 |
| | | | NZ 273497 | A | 25-03-1998 |
| | | | US 5981229 | A | 09-11-1999 |
| ----- | | | | | |
| EP 0622081 | A | 02-11-1994 | AU 682018 | B | 18-09-1997 |
| | | | AU 5769694 | A | 27-10-1994 |
| | | | CA 2116261 | A | 21-10-1994 |
| | | | FI 941695 | A | 21-10-1994 |
| | | | JP 7126291 | A | 16-05-1995 |
| | | | NO 941420 | A | 21-10-1994 |
| | | | US 5965141 | A | 12-10-1999 |
| | | | US 6027734 | A | 22-02-2000 |
| | | | US 5980909 | A | 09-11-1999 |
| | | | US 6042838 | A | 28-03-2000 |
| | | | US 5679768 | A | 21-10-1997 |
| | | | US 5997882 | A | 07-12-1999 |
| | | | US 5955089 | A | 21-09-1999 |
| | | | ZA 9401584 | A | 12-10-1994 |
| ----- | | | | | |



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| | | |
|--|-----------|---|
| (51) International Patent Classification ⁷ : C12N 15/31, C07K 14/315, 16/12, G01N 33/50, A61K 39/09, C12Q 1/68 | A3 | (11) International Publication Number: WO 00/06737 (43) International Publication Date: 10 February 2000 (10.02.00) |
| (21) International Application Number: PCT/GB99/02451 (22) International Filing Date: 27 July 1999 (27.07.99) (30) Priority Data: 9816337.1 27 July 1998 (27.07.98) GB 60/125,164 19 March 1999 (19.03.99) US (71) Applicant (for all designated States except US): MICROBIAL TECHNICS LIMITED [GB/GB]; 20 Trumpington Street, Cambridge CB2 1QA (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): GILBERT, Christophe, François, Guy [FR/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB1 1PQ (GB). HANSBRO, Philip, Michael [GB/GB]; University of Cambridge, Dept. of Pathology, Tennis Court Road, Cambridge CB2 1QP (GB). (74) Agents: CHAPMAN, Paul, William et al.; Kilburn & Strode, 20 Red Lion Street, London WC1R 4PJ (GB). | | (81) Designated States: CN, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With a revised version of the international search report.</i> (88) Date of publication of the international search report: 29 June 2000 (29.06.00) (88) Date of publication of the revised version of the international search report: 9 November 2000 (09.11.00) |
| (54) Title: STREPTOCOCCUS PNEUMONIAE PROTEINS AND NUCLEIC ACID MOLECULES (57) Abstract Novel protein antigens from <i>Streptococcus pneumoniae</i> are disclosed, together with nucleic acid sequences encoding them. Their use in vaccines and in screening methods is also described. | | |

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| | | | | | | | |
|-----------|--------------------------|-----------|--|-----------|--|-----------|--------------------------|
| AL | Albania | ES | Spain | LS | Lesotho | SI | Slovenia |
| AM | Armenia | FI | Finland | LT | Lithuania | SK | Slovakia |
| AT | Austria | FR | France | LU | Luxembourg | SN | Senegal |
| AU | Australia | GA | Gabon | LV | Latvia | SZ | Swaziland |
| AZ | Azerbaijan | GB | United Kingdom | MC | Monaco | TD | Chad |
| BA | Bosnia and Herzegovina | GE | Georgia | MD | Republic of Moldova | TG | Togo |
| BB | Barbados | GH | Ghana | MG | Madagascar | TJ | Tajikistan |
| BE | Belgium | GN | Guinea | MK | The former Yugoslav Republic of Macedonia | TM | Turkmenistan |
| BF | Burkina Faso | GR | Greece | | | TR | Turkey |
| BG | Bulgaria | HU | Hungary | ML | Mali | TT | Trinidad and Tobago |
| BJ | Benin | IE | Ireland | MN | Mongolia | UA | Ukraine |
| BR | Brazil | IL | Israel | MR | Mauritania | UG | Uganda |
| BY | Belarus | IS | Iceland | MW | Malawi | US | United States of America |
| CA | Canada | IT | Italy | MX | Mexico | UZ | Uzbekistan |
| CF | Central African Republic | JP | Japan | NE | Niger | VN | Viet Nam |
| CG | Congo | KE | Kenya | NL | Netherlands | YU | Yugoslavia |
| CH | Switzerland | KG | Kyrgyzstan | NO | Norway | ZW | Zimbabwe |
| CI | Côte d'Ivoire | KP | Democratic People's Republic of Korea | NZ | New Zealand | | |
| CM | Cameroon | | Republic of Korea | PL | Poland | | |
| CN | China | KR | Republic of Korea | PT | Portugal | | |
| CU | Cuba | KZ | Kazakstan | RO | Romania | | |
| CZ | Czech Republic | LC | Saint Lucia | RU | Russian Federation | | |
| DE | Germany | LI | Liechtenstein | SD | Sudan | | |
| DK | Denmark | LK | Sri Lanka | SE | Sweden | | |
| EE | Estonia | LR | Liberia | SG | Singapore | | |

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/31 C07K14/315 C07K16/12 G01N33/50 A61K39/09
C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K G01N A61K C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | WO 98 18931 A (DOUGHERTY BRIAN A ;HUMAN GENOME SCIENCES INC (US); ROSEN CRAIG A () 7 May 1998 (1998-05-07) SEQ ID NO 3,5,21,69,127,139,187 --- | 1,3-7, 9-19 |
| T | LANGE ROLAND ET AL: "Domain organization and molecular characterization of 13 two-component systems identified by genome sequencing of Streptococcus pneumoniae." GENE (AMSTERDAM) SEPT. 3, 1999, vol. 237, no. 1, pages 223-234, XP004183515 ISSN: 0378-1119 page 229; figures 1,3 --- -/- | 1,3-7 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

23 August 2000

Date of mailing of the international search report

31.08.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

ESPEN, J

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | GUENZI ERIC ET AL: "A two-component signal-transducing system is involved in competence and penicillin susceptibility in laboratory mutants of Streptococcus pneumoniae." MOLECULAR MICROBIOLOGY 1994, vol. 12, no. 3, 1994, pages 505-515, XP000905352 ISSN: 0950-382X --- | |
| P,X | EP 0 885 966 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 23 December 1998 (1998-12-23) SEQ ID NO 1,2,3 --- | 1,3-7, 9-19 |
| P,X | EP 0 891 984 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 20 January 1999 (1999-01-20) SEQ ID No 1,3,4 --- | 1,3-7, 9-19 |
| X | WO 98 18930 A (HUMAN GENOME SCIENCES INC ;CHOI GIL H (US); HROMOCKYJ ALEX (US); J) 7 May 1998 (1998-05-07) SEQ ID NO 7,8,113,114,133,134,163,164,169,170 --- | 1,3-7, 9-19 |
| P,X | EP 0 887 413 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 30 December 1998 (1998-12-30) SEQ ID NOs 1,2,3,4 page 4-6 --- | 1,3-7, 9-19 |
| P,X | FONTAN PA ET AL: "Streptococcus pneumoniae choline transporter" EMBL DATABASE ENTRY AF162656, ACCESSION NUMBER AF162656,26 July 1999 (1999-07-26), XP002136498 nucleotide sequence and deduced amino acid sequence --- | 1,3-7 |
| X | FONTAN P A ET AL: "A choline transporter as a virulence determinant of Streptococcus pneumoniae." 97TH GENERAL MEETING OF THE AMERICAN SOCIETY FOR MICROBIOLOGY;MIAMI BEACH, FLORIDA, USA; MAY 4-8, 1997, vol. 97, 1997, page 103 XP000892162 Abstracts of the General Meeting of the American Society for Microbiology 1997 ISSN: 1060-2011 abstract --- -/-- | 1,3-7 |

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| Y | TAKEMOTO K ET AL: "Putative ferric transport ATP-binding protein AFUC" SWISSPROT DATABASE ENTRY AFUC_ECOLI, ACCESSION NUMBER P37009, 1 June 1994 (1994-06-01), XP002136499 sequence --- | 6,9 |
| Y | FLEISCHMANN RD ET AL: "Putative ferric transport ATP-binding protein AFUC" SWISSPROT DATABASE ENTRY AFUC_HAEIN, ACCESSION NUMBER P44531, 1 November 1995 (1995-11-01), XP002136500 sequence --- | 6,9 |
| Y | BLATTNER FR ET AL: "Spermidine/putrescine transport ATP-binding protein POTA" SWISSPROT DATABASE ENTRY POTA_ECOLI, ACCESSION NUMBER P23858, 1 November 1991 (1991-11-01), XP002136501 sequence --- | 6,9 |
| P,A | POLISSI ALESSANDRA ET AL: "Large-scale identification of virulence genes from Streptococcus pneumoniae." INFECTION AND IMMUNITY DEC., 1998, vol. 66, no. 12, December 1998 (1998-12), pages 5620-5629, XP002136502 ISSN: 0019-9567 --- | |
| A | DINTILHAC A ET AL: "The adc locus, which affects competence for genetic transformation in Streptococcus pneumoniae, encodes an ABC transporter with a putative lipoprotein homologous to a family of streptococcal adhesins." RESEARCH IN MICROBIOLOGY 1997, vol. 148, no. 2, 1997, pages 119-131, XP002115703 ISSN: 0923-2508 --- | |
| A | WO 95 06732 A (MASURE H ROBERT ;TUOMANEN ELAINE (US); PEARCE BARBARA J (US); UNIV) 9 March 1995 (1995-03-09) --- | |
| A | EP 0 622 081 A (UAB RESEARCH FOUNDATION) 2 November 1994 (1994-11-02) ----- | |

INTERNATIONAL SEARCH REPORT

...ernational application No.
PCT/GB 99/02451

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 20
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1,3-7,9-19 (SEQ ID NO: 1,208; 27,235; 80,292; 132,344; 138,350; 162,178; 166,182)
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 20

Claim 20 relates to the use of an agent capable of antagonising, inhibiting or otherwise interfering with the function or expression of a protein or polypeptide as defined in Tables 2-4 in the manufacture of a medicament. Neither a true technical characterization is given for such an agent, nor is such an agent defined in the application. In consequence, the scope of said claim is ambiguous and vague, and its subject-matter is not sufficiently disclosed and supported (Art. 5 and 6 PCT).

No search can be carried out for such purely speculative claims whose wording is, in fact, a mere recitation of the result to be achieved.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: in part: 1,3-7,9-19; all as far as applicable

Streptococcus (S.) pneumoniae protein or polypeptide having a sequence relating to SEQ ID No 1, antigenic and/or immunogenic fragment thereof; nucleic acid molecule relating to SEQ ID No 208, and vaccine comprising said nucleic acid; use of said protein or polypeptide as an immunogen and/or antigen; immunogenic and/or antigenic composition comprising said protein or polypeptide, and its use as a vaccine; antibody directed to said protein or polypeptide; method for the detection/diagnosis using either said protein/polypeptide, or said antibody, or said nucleic acid molecule; method of determining whether said protein or polypeptide represents a potential anti-microbial target

2-179. Claims: in part: 1-19; all as far as applicable

as invention 1 but limited to subject-matter relating SEQ ID Nos 2-151 (table 2), SEQ ID Nos 152-167 (table 3), and SEQ ID Nos 184-195 (table 4) and the corresponding nucleic acid molecules; wherein
invention 2 is limited to SEQ ID No 2,
invention 3 is limited to SEQ ID No 3, etc...
invention 179 is limited to SEQ ID No 195.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02451

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|----------------------------|---------------------|
| WO 9818931 | A | 07-05-1998 | AU 5194598 A | 22-05-1998 |
| | | | AU 6909098 A | 22-05-1998 |
| | | | EP 0942983 A | 22-09-1999 |
| | | | EP 0941335 A | 15-09-1999 |
| | | | WO 9818930 A | 07-05-1998 |
| ----- | | | | |
| EP 0885966 | A | 23-12-1998 | CA 2235435 A | 20-12-1998 |
| | | | JP 11103873 A | 20-04-1999 |
| ----- | | | | |
| EP 0891984 | A | 20-01-1999 | CA 2235441 A | 20-12-1998 |
| | | | JP 11225772 A | 24-08-1999 |
| ----- | | | | |
| WO 9818930 | A | 07-05-1998 | AU 5194598 A | 22-05-1998 |
| | | | AU 6909098 A | 22-05-1998 |
| | | | EP 0942983 A | 22-09-1999 |
| | | | EP 0941335 A | 15-09-1999 |
| | | | WO 9818931 A | 07-05-1998 |
| ----- | | | | |
| EP 0887413 | A | 30-12-1998 | JP 11075878 A | 23-03-1999 |
| ----- | | | | |
| WO 9506732 | A | 09-03-1995 | US 5928900 A | 27-07-1999 |
| | | | AU 709405 B | 26-08-1999 |
| | | | AU 7680994 A | 22-03-1995 |
| | | | CA 2170726 A | 09-03-1995 |
| | | | EP 0721506 A | 17-07-1996 |
| | | | FI 960977 A | 30-04-1996 |
| | | | JP 9504686 T | 13-05-1997 |
| | | | NO 960839 A | 19-04-1996 |
| | | | NZ 273497 A | 25-03-1998 |
| | | | US 5981229 A | 09-11-1999 |
| ----- | | | | |
| EP 0622081 | A | 02-11-1994 | AU 682018 B | 18-09-1997 |
| | | | AU 5769694 A | 27-10-1994 |
| | | | CA 2116261 A | 21-10-1994 |
| | | | FI 941695 A | 21-10-1994 |
| | | | JP 7126291 A | 16-05-1995 |
| | | | NO 941420 A | 21-10-1994 |
| | | | US 5965141 A | 12-10-1999 |
| | | | US 6027734 A | 22-02-2000 |
| | | | US 5980909 A | 09-11-1999 |
| | | | US 6042838 A | 28-03-2000 |
| | | | US 5679768 A | 21-10-1997 |
| | | | US 5997882 A | 07-12-1999 |
| | | | US 5955089 A | 21-09-1999 |
| | | | ZA 9401584 A | 12-10-1994 |
| ----- | | | | |